AAGL 26

55TH GLOBAL CONGRESS ON MIGS

BOSTON, MASSACHUSETTS
NOVEMBER 13-16, 2026

Syllabus

PG-14008

C-Section Scar Ectopic and Niche Evaluation and Management

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SCIENTIFIC PROGRAM CHAIR
Nash S. Moawad, MD

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Michael Hibner, MD, PhD



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PG-14008: C-Section Scar Ectopic and Niche Evaluation and Management

Chair: Judith Huirne
Co-Chair: Ally Murji
Faculty: Sven Becker, Lacey C. Brennan, Robert A. de Leeuw, Judith Huirne, Ally Murji

Course Description

Cesarean scar niche (isthmocele) and cesarean scar ectopic pregnancy, are increasingly encountered in gynecologic and reproductive practice. However, variability remains in their diagnosis, clinical significance, patient counselling, and management. This interactive, case-based course will provide a practical and evidence-based approach to evaluating and managing cesarean scar disorders. Faculty will review standardized diagnosis and imaging, explore management of patients presenting with abnormal uterine bleeding, pain, infertility, or an asymptomatic niche, and discuss considerations prior to embryo transfer and future pregnancy. Through clinical cases and surgical video, participants will learn how to select appropriate candidates for expectant, medical, hysteroscopic, and laparoscopic management and review key surgical techniques for niche repair. The course will conclude with a practical approach to the diagnosis and management of cesarean scar ectopic pregnancy.

Learning Objectives: 1) Diagnose and characterize cesarean scar niche and pregnancy using standardized clinical and imaging criteria; 2) Develop an individualized, evidence-based management plan for cesarean scar niche based on clinical presentation, niche characteristics, residual myometrial thickness, fertility and pregnancy goals, and patient preferences; and 3) Apply tips and tricks for surgical management of cesarean scar niche and pregnancy.

Course Outline

10:15 am	Welcome, Introduction and Course Overview	J. Huirne and A. Murji
10:20 am	Overview of Cesarean Scar Niche: Diagnosis and Classification	R. de Leeuw
10:35 am	Evidence-Based Management of Cesarean Scar Niche	J. Huirne
10:50 am	Predisposing Factors and Prevention Strategies of Cesarean Scar Niche	S. Becker
11:05 am	How to Counsel Patients? Interactive Case-Based Discussion and Evidence Review	R. de Leeuw and A. Murji
11:20 am	Surgical Tips and Tricks for Niche Repair: Hysteroscopic and Laparoscopic Approaches	L. Brennan
11:40 am	Implementation and Standardization of Diagnosis and Treatment of Niche Disorders	J. Huirne
11:50 am	Cesarean Scar Ectopic Pregnancy: Diagnosis and Management	A. Murji
12:05 pm	Discussion Questions & Answers	All faculty
12:15 pm	Adjourn	

ADA Statement: In accordance with the Americans with Disabilities Act (ADA), please contact CMEsupport@aagl.org should you require any special assistance.

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Asterisk (*) denotes no financial relationships with ACCME-defined ineligible companies to disclose.

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The following members of AAGL have been involved in the educational planning and/or review of this course (listed in alphabetical order by last name).

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Judith Huirne, MD – Consultant: IkherstelBV; Stockholder: IkherstelBV; Contracted Research: Samsung, Hologic

COURSE CO-CHAIR DISCLOSURE

Ally Murji, MD, FRCSC, MPH*

FACULTY DISCLOSURES

The following faculty have agreed to support their presentations and clinical recommendations with the best available evidence from the medical literature (in alphabetical order by last name).

Sven Becker, MD, PhD*
Lacey C. Brennan, MD, MBE – Instructor: Johnson & Johnson
Robert A. de Leeuw, MD, PhD – Contracted Research: Medtronic
Judith Huirne, MD – Consultant: IkherstelBV; Stockholder: IkherstelBV; Research Grant: Samsung, Hologic
Ally Murji, MD, FRCSC, MPH*

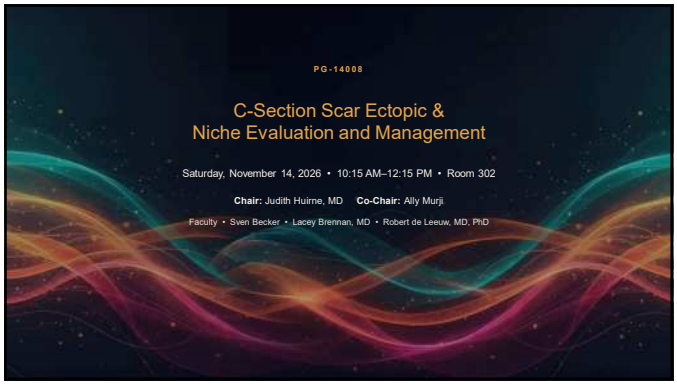
MITIGATION OF RELEVANT FINANCIAL RELATIONSHIPS

All relevant financial relationships have been mitigated.

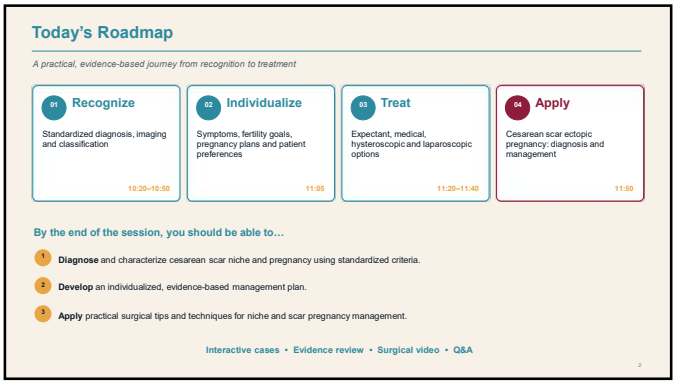
Drs. Lee, Lemos, Mikhail, and Chaudhari's planning decisions, as part of the Scientific Program Committee (SPC), were peer reviewed by other planners on the SPC who had disclosed no financial relationships with ineligible companies, and found to be fair, balanced, and free of commercial bias. Dr. Moawad's financial relationships ended 12/2024, thus mitigating them. For most of his AAGL Professional Education Committee service, Dr. Mourad had no financial relationships to disclose. He recently disclosed a new relationship as a Proctor for Intuitive Surgical. Since then, he has not participated in activities involving control or influence over accredited educational content; therefore, no additional mitigation was necessary.

Dr. Huirne's role as Course Chair was limited primarily to course oversight and moderation, rather than development of educational content. Any planning decisions or content under her influence were subject to independent peer review by individuals without relevant financial relationships.

The presentation content for course faculty, Drs. Brennan, de Leeuw, and Huirne, has been peer reviewed and found to be fair, balanced, and free from commercial bias.


PG-14008
C-Section Scar Ectopic &
Niche Evaluation and Management
Saturday, November 14, 2026 • 10:15 AM–12:15 PM • Room 302
Chair: Judith Huirne, MD Co-Chair: Ally Murji
Faculty • Sven Becker • Lacey Brennan, MD • Robert de Leeuw, MD, PhD

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Today's Roadmap
A practical, evidence-based journey from recognition to treatment
01 Recognize
Standardized diagnosis, imaging and classification
10:20–10:50
02 Individualize
Symptoms, fertility goals, pregnancy plans and patient preferences
11:05
03 Treat
Expectant, medical, hysteroscopic and laparoscopic options
11:20–11:40
04 Apply
Cesarean scar ectopic pregnancy: diagnosis and management
11:50
By the end of the session, you should be able to…
1 Diagnose and characterize cesarean scar niche and pregnancy using standardized criteria.
2 Develop an individualized, evidence-based management plan.
3 Apply practical surgical tips and techniques for niche and scar pregnancy management.
Interactive cases • Evidence review • Surgical video • Q&A
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Course Agenda
Saturday, November 14, 2026 • 10:15 AM–12:15 PM • Room 302
10:15 Welcome, Introduction and Course Overview J. Huirne & A. Murji
10:20 Overview of Cesarean Scar Niche: Diagnosis and Classification R. de Leeuw
10:35 Evidence-Based Management of Cesarean Scar Niche J. Huirne
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11:40 Implementation and Standardization of Diagnosis and Treatment J. Huirne
11:50 Cesarean Scar Ectopic Pregnancy: Diagnosis and Management A. Murji
12:05 Discussion and Q&A Faculty
12:15 Adjourn
From recognition to treatment • practical, evidence-based and case-driven

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Overview of Cesarean Scar Niche: Diagnosis and Classification

Robert A. de Leeuw, MD, PhD · Amsterdam UMC, the Netherlands

NOVEMBER 13-16, 2026 · BOSTON · #AAGL26

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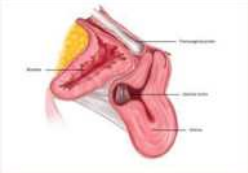
Disclosure

- **Grant / Research Support:** Medtronic (research and education grant)
- *Medtronic had no role in, and no influence on, the studies discussed in this presentation.*

2

Objectives

- **Differentiate** a cesarean scar niche (imaging finding) from Cesarean Scar Disorder (CSDi)
- **Select** the most accurate imaging technique to diagnose a niche
- **Apply** standardized niche measurements and classification

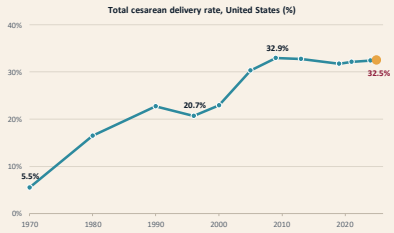


Sagittal view: uterine niche at the cesarean scar

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INTRODUCTION

1 in 3 US babies is born by cesarean – and rising



32.5%

US cesarean rate in 2025 – highest since 2013 (provisional)

Taffel 1987; Martin 2021 (NCHS Final Data 2019); NCHS Final Data 2024; NCHS Provisional Data 2025; Betran 2021

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INTRODUCTION

2Close: 7 in 10 women have a niche after a first CS



68.9% niche after single-layer closure

73.6% niche after double-layer closure

- Multicenter RCT · 32 Dutch hospitals · n = 2,292 women with a first CS
- Transvaginal ultrasound 3 months after the CS
- **A niche is the rule, not the exception**

Stegwee 2021 (2Close, BJOG)

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INTRODUCTION

The literature shows comparable numbers



Systematic review, update of Bij de Vaate 2014

- 44 imaging studies and 103 symptom studies
- Prevalence depends on population, timing, definition and imaging technique

42–84% have a niche on contrast sonohysterography (10 studies, unselected women after CS)

13–75% have a niche on plain TVUS using the ≥ 2 mm definition (8 studies)

9 of 41 prevalence studies used the Niche Taskforce definition

Klein Meuleman, Min et al. 2023 (Best Pract Res Clin Obstet Gynaecol); Bij de Vaate 2014

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INTRODUCTION

But a niche by itself is not a disease



NICHE
An indentation of the myometrium of at least 2 mm at the site of the cesarean scar
European Niche Taskforce (Jordans 2019)

- An imaging finding – not a diagnosis
- Only 30–40% of women with a niche have symptoms
- Treating images leads to overtreatment

Don't treat a niche – treat your patient

Jordans 2019; Klein Meuleman 2023 (JAMA Netw Open)

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CESAREAN SCAR DISORDER

From niche to disorder: an international consensus

1 Systematic review
Symptoms reported in association with a niche

2 Focus groups
5 Dutch niche experts and patients with a niche

3 eDelphi
31 experts · 3 continents · 3 rounds · consensus = RoA ≥ 70%

4 Patient endorsement
Results discussed with patient representatives



Scan for paper

Klein Meuleman 2023 (JAMA Netw Open); RoA = rate of agreement

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CESAREAN SCAR DISORDER

CSDi = niche + ≥ 1 primary or ≥ 2 secondary symptoms

Niche on US ≥ 2 mm + **≥ 1 primary** symptom or **≥ 2 secondary** symptoms

Primary symptoms
- Postmenstrual spotting
- Pain during uterine bleeding
- Technical issues with the catheter at embryo transfer
- Secondary unexplained infertility with intrauterine fluid

Secondary symptoms
- Dyspareunia
- Abnormal vaginal discharge
- Chronic pelvic pain
- Avoiding sexual intercourse
- Odor associated with abnormal blood loss
- Secondary unexplained infertility
- Secondary infertility despite ART
- Negative self-image
- Discomfort during leisure activities

Klein Meuleman 2023 (JAMA Netw Open) – definition reached RoA 77.8%

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CESAREAN SCAR DISORDER

Before you call it CSDi

Diagnostic criteria
- ≥ 3 regular menstrual cycles after the CS
- Premenopausal
- Symptoms started – or clearly worsened – after the CS
- Can be cured (this does not mean every CSDi should be treated)

Exclude first
- Cervical dysplasia
- Vaginal or uterine infection
- Other intracavitary pathology
- Other causes of spotting (continuous OC, IUD)
- Anovulatory cycles



42.5%
met CSDi criteria 3 years after a first CS (2Close, n = 670)

Cesarean scar pregnancy, PAS and uterine rupture are complications of CSDi – not symptoms

Klein Meuleman 2023 (JAMA Netw Open); Klein Meuleman 2025 (Acta Obstet Gynecol Scand)

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IMAGING

To diagnose CSDi, we need imaging



Transvaginal ultrasound
+ Cost-effective, minimally invasive, least training
– Misses niches without intrauterine fluid



Contrast: SIS / GIS
+ More accurate than TVUS
+ Deeper niche, thinner RMT
– Slight discomfort; may detect small, irrelevant niches



Hysteroscopy
+ Direct view of morphology, vessels, debris
– Invasive; no standardized measurement; no RMT



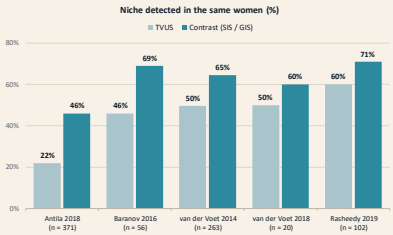
MRI
+ Whole-pelvis view; adenomyosis; surgical planning
– Expensive, less available; RMT measured thicker

Klein Meuleman, Min et al. 2023 (systematic review: 44 imaging studies)

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IMAGING

Contrast finds the niches plain TVUS misses



49% sensitivity of plain TVUS vs contrast sonography (Antila 2018)

With contrast the niche is deeper and the RMT thinner (van der Voet 2014)

TVUS first – add GIS or SIS when there is no intrauterine fluid

Antila-Långsjö 2018; Baranov 2016; van der Voet 2014, 2018; Rasheedy 2019 – summarized in Klein Meuleman 2023

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IMAGING

Same woman, same day: without and with gel

Plain TVUS · No niche visible



Gel instillation (GIS) · Niche clearly outlined



No intrauterine fluid? Add gel or saline before you conclude "no niche"

Amsterdam UMC case; Jordans 2019; Klein Meuleman, Min et al. 2023

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IMAGING

Hysteroscopy and MRI: second line

Hysteroscopy



- No standardized measurement – first structured protocol: ESGE Delphi 2024 (13 experts)
- Cannot measure RMT: always combine with ultrasound
- Consider when imaging is negative but suspicion is high

MRI



- Niche prevalence 6–50% in unselected women (3 studies)
- RMT thicker on MRI than on TVUS / SHG
- Added value: adenomyosis, (scar) endometriosis, surgical planning

Min 2024 (Facts Views Vis Obgyn); Klein Meuleman, Min et al. 2023; Tang 2019

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FUTURE

Next: AI that segments the niche



Manual segmentation of a niche on TVUS – standardized protocol, 3 annotators

Post, Jumutc, Bliznuks, Huirne, Schor, de Leeuw – Ultrasound Obstet Gynecol 2025 (abstract)

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FUTURE

Promising – but not ready for the clinic yet



Worst case – DSC 0.14 Best case – DSC 0.96

Why the model fails

- Little fluid in the niche
- Excess fluid in the cavity
- Acoustic shadowing

Reader study (10 videos): not yet good enough to support referral by GPs or fertility doctors – it also segments structures other than the niche

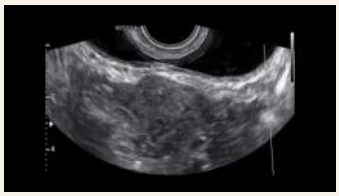
Next: refine with these lessons and validate – then bring niche detection to every scanner

Post et al. Ultrasound Obstet Gynecol 2025 (abstract); green = ground truth, red = prediction

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HOW TO MEASURE

When and how: a standardized niche exam



Jordans 2019 – Delphi

Verberkt 2022 – How-to

WHEN

- ≥ 3 regular menstrual cycles after the CS (CSDi criterion)
- Preferably ≥ 6 months after CS for scar healing

HOW

1. Optimize settings: focus, depth and zoom
2. Start midsagittal; find the plane where the niche is largest
3. No intrauterine fluid? Add GIS or SIS
4. Assess sagittal AND transverse planes

Jordans 2019; Verberkt 2022; Klein Meuleman 2023 (JAMA Netw Open); Klein Meuleman, Min et al. 2023

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HOW TO MEASURE

What to measure: the sagittal plane

Length
Largest length and length at the base



Depth
Main niche, and including a branch



RMT
Residual myometrium at its thinnest point



AMT
Adjacent myometrium, fundal of the niche



Ignore the endometrium | **Fibrosis is not myometrium** | **Measure where the niche is largest**

Jordans 2019; Verberkt 2022 – Illustrations: Amsterdam UMC niche e-learning

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HOW TO MEASURE

Transverse plane: width – and research extras

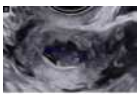


Transverse sweep through the niche

Width

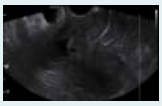


Largest width and width at the base



For research, also record

- Distance niche – vesicovaginal fold
- Doppler
- Sliding sign: vesicouterine adhesions



Jordans 2019; Verberkt 2022

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CLASSIFICATION

Classify: simple, one branch, complex



Simple niche



Simple niche with one branch



Complex niche (> 1 branch)



Branch = a thinner part of the main niche, directed towards the serosa

Red main niche · **blue** branch

Large niche: no consensus yet

Proposal: RMT < 2–3 mm, until cut-offs based on symptoms or rupture risk exist

Jordans 2019; Klein Meuleman, Min et al. 2023

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UNIFORM MEASUREMENT

Compare apples with apples

"Large niche" in the literature – four definitions:

RMT / AMT < 0.25 Dosedla 2020	**Depth / AMT > 0.50** Gupta 2021
RMT / AMT < 0.50 van der Voet 2014	**Depth ≥ 5 mm or RMT ≤ 2.1 mm or depth / AMT ≥ 0.56** Wang 2022

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prevalence studies used the Taskforce niche definition

- Use the Jordans / Verberkt protocol in every study
- Report the same measurements so data can be pooled
- Then define "large" by outcome

Klein Meuleman, Min et al. 2023; Dosedla 2020; Gupta 2021; van der Voet 2014; Wang 2022

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CONCLUSION

Take-home messages

1. **Don't diagnose a niche – diagnose CSDi**
   Niche on ultrasound + ≥ 1 primary or ≥ 2 secondary symptoms (international Delphi)
2. **Use the right imaging**
   TVUS first; add GIS / SIS when there is no intrauterine fluid. Hysteroscopy and MRI are second line
3. **Measure uniformly**
   Jordans / Verberkt protocol in both planes, classify branches – so research compares apples with apples

Niche ultrasound e-learning
gynaecologyonline.com
Next: AI-assisted niche segmentation

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- **B. Schor** – The Alan Turing Institute, London, UK
- **CSDi study group · 2Close study group · European Niche Taskforce**



Amsterdam UMC niche research team

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Evidence – Based management of Cesarean Scar Niche

Prof. dr. Judith Huirne, as prof. dr. de Leeuw



AAGL - 55th Global congress on MIGS - Boston 2026

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Disclosures

Research Grants

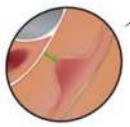
- HYSNICHE Trial (ZonMw)
- 2 Close trial (ZonMw)
- RCT barbed sutures (Metronic)

no role in, and no influence on, the studies discussed in this presentation



2

Long term complications



Obstetric complications
-PAS
-uterine rupture
- CSP

Gynaecological symptoms

Subfertility

1) BijdeVaate.. **Huirne** UJOG 2014, Wang 2021
2) Vissers...**Huirne** Human Reproduction 2020, Wang et al. 2017

3

What is the evidence for different interventions?



4

When to intervene

Harm from the disease

Harm from treatment

Overtreatment!

We should not treat only a sonographic finding !

5

How to intervene?

Medical	No treatment	Hormonal treatment	**Depends on** - Symptoms - Wish to become pregnant? - Type of niche - Other pathology - Are we able to improve outcomes using surgery?
Surgery	Hysteroscopic niche resection	Laparoscopic/ vaginal niche resection	<10%

6

Surgical therapies



Hysteroscopic niche resection RMT > 2.5mm:
does NOT restore the anatomy



laparoscopic or vaginal niche resection <2.5 : aims to restore the anatomy

Vd Voet et al. Systematic review BJOG 2014

7

How to intervene?

Cycle disorder and a small niche RMT> 2.5mm



No treatment

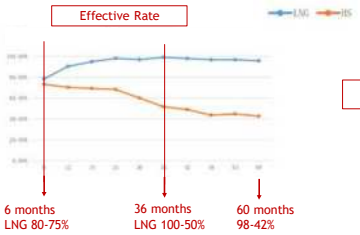
Hormonal treatment

Hysteroscopic niche resection

Laparoscopic/ vaginal niche resection

8

RCT n=206, 5 year follow-up



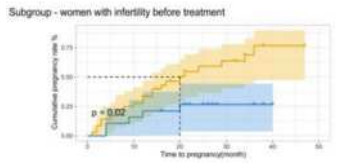
LNG is first line therapy

Zhang et al. AJOG 2023, Yan et al AOG 2025, Zang et al. Submitted

9

Effect hysteroscopic niche resection vs expectant on PR

Cohortstudy n=176



HNR

expectant

In the subgroup without infertility: no significant differences

He, Wei Xia, Zang, Mol, Zhang, Huirne, EJOGRB 2023

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How to intervene?

Infertility & symptoms and a large niche RMT< 2.5mm

No treatment

Hormonal treatment

Hysteroscopic niche resection

Laparoscopic niche resection



1 Vervoort et al. BJOG 2018 *2 Vissers et al. ACOG 2023*

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IDEAL Framework LapNiche



Klein Meuleman et al. Lancet Surgery and Anaesthesiology *accepted*

12

BJOG An International Journal of Obstetrics and Gynaecology

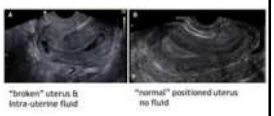
General gynaecology

The effect of laparoscopic resection of large niches in the uterine caesarean scar on symptoms, ultrasound findings and quality of life: a prospective cohort study

AJNW Vervoort, J Vissers, WJK Hehenkamp, HAM Brölmann, JAF Huirne

Cohort n=159
- 9 days reduction in spotting
- 5 points reduction in dysmenorrhoe
- QOL improved (6/8 domains)

Evaluate the anatomic results!



Vervoort et al. BJOG 2018[1]
Vissers et al. ACTA 2023[3]
Stegwee et al. EJOGRB 2020[2]

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AOGS Acta Obstetricia et Gynecologica Scandinavica

ORIGINAL RESEARCH ARTICLE | Open Access

Reproductive outcomes after laparoscopic resection of symptomatic niches in uterine cesarean scars: Long-term follow-up on the prospective LAPNICHE study

Jolijn Vissers, Wouter J. K. Hehenkamp, Hans A. M. Brölmann, Cornelis B. Lambalk, Judith A. F. Huirne

First published: 12 September 2023 | https://doi.org/10.1111/aogs.14647 | Citations: 1

Prospective Cohort study n=137

50% failed ART

Reduction in fluid 42% -> 5%

63% pregnant < 3 monhts

Vissers et al. ACTA 2023[3]

14

Laparoscopic niche resection

- Promising results
- Selected group: strict criteria
- Comparison to usual care : RCT's for each indication group

Vissers et al. ACTA 2023[3]

15

IDEAL Framework LapNiche



Klein Meuleman et al. Lancet Surgery and Anaesthesiology *accepted*

16

BMJ Open Visit the journal

Effectiveness of laparoscopic niche resection versus expectant management in patients with unexplained infertility and a large uterine caesarean scar defect (uterine niche): protocol for a randomised controlled trial (the LAPRES study)

Women with a large niche

RMT < 2.5 mm

Vissers et al. BMJ open 2023

17

3 RCTs

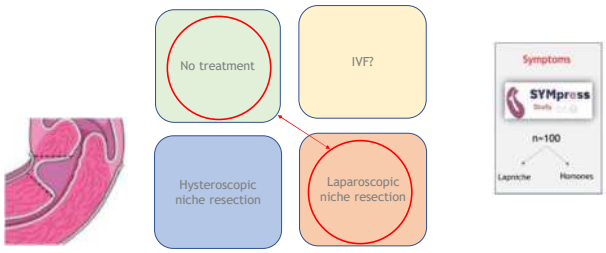
Symptoms	Infertility> 1year	Pregnancy Desire No infertility
SYMpress Study	Lapress Study	Nopress Study
n=100	n=200	n=200
Lapniche / Homones	Lapniche / Expectant	Lapniche / Expectant
Completed	Completed	Ongoing

www.lapress.nl

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How to intervene

Symptoms and a large niche RMT< 2.5mm



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SYMPRES design

IDEAL 3 · Assessment

Large symptomatic niche
RMT ≤ 3 mm
No wish to conceive

Laparoscopic repair
within 6 weeks · n = 50

Hormonal therapy
of choice, ≥ 6 months · n = 50



Primary outcome: ≥ 50% fewer spotting days at 6 months

SYMPRES – single-centre RCT, Amsterdam UMC, 2021–2025; NL9534 / NL-OMON54858

20

Sympres Study

IDEAL 3 · Assessment

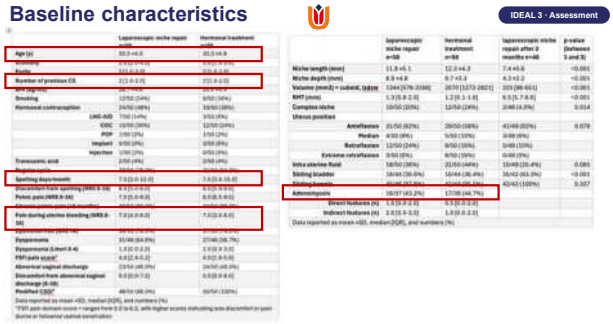
155 assessed
54 ineligible – incl. 22 declined, 8 requested hysterectomy
101 enrolled
1 excluded after randomisation
100 randomised
50 laparoscopic repair
50 hormonal therapy
2 stopped / lost
20 stopped: 16 side effects or dissatisfaction, 2 pregnant, 2 lost
48 in ITT analysis
48 in ITT analysis

SYMPRES – preliminary data, manuscript under review

21

Baseline characteristics

IDEAL 3 · Assessment



SYMPRES – preliminary data, manuscript under review

22

Primary and pain outcomes

IDEAL 3 · Assessment

Outcome	Repair	Hormonal	Risk ratio (95% CI)	RR
≥ 50% fewer spotting days				
3 months	32/40 (80%)	19/38 (50%)		1.60 (1.12–2.28)
6 months – primary outcome	**30/42 (71%)**	**19/38 (50%)**		**1.43 (0.99–2.07)**
≥ 2-point reduction in pelvic pain				
3 months	27/44 (61%)	14/39 (36%)		1.71 (1.06–2.76)
6 months	27/43 (63%)	12/43 (28%)		2.25 (1.32–3.83)
Dysmenorrhoea below NRS 4				
6 months	–	–		0.82 (0.54–1.23)

← favours hormonal favours repair →

SYMPRES – preliminary data, manuscript under review

23

Pain, satisfaction, QOL

IDEAL 3 · Assessment

Pelvic pain (NRS)	Satisfied	EQ-5D index	Sexual dysfunction
0 vs 8	59% vs 23%	0.83 vs 0.59	32% vs 56%

Repair Hormonal

SYMPRES – preliminary data, manuscript under review

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Anatomy and harms

IDEAL 3 · Assessment

Residual myometrium
1.3 → 6.5
mm · bladder slides in 83%

Surgical complications
2 / 48
1 bladder injury · 1 ACNES

Still on hormones
65%
headache 76% · mood 71%

SYMPRES – preliminary data, manuscript under review

25

Limitations

IDEAL 3 · Assessment

- Selection
- No blinding
- Cross-contamination
- 6 months, 1 centre

Expert center, completed learningcurve!

SYMPRES – preliminary data, manuscript under review

26

Advice in case of symptoms

IDEAL 3 · Assessment

Counsel by the main symptom

Hormones first
Dysmenorrhoea · adenomyosis

Consider repair
Spotting · pelvic pain · hormones fail

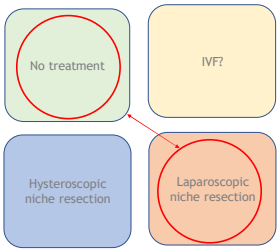
SYMPRES – preliminary data, manuscript under review

27

How to intervene?

Infertility and a large niche RMT< 2.5mm



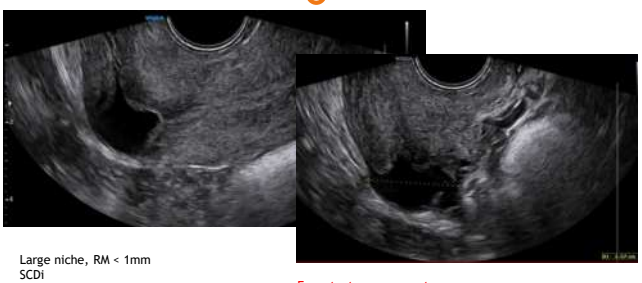




1 Vervoort et al BJOG 2018 2 Vissers et al. ACOG 2023

28

No niche repair outside the study

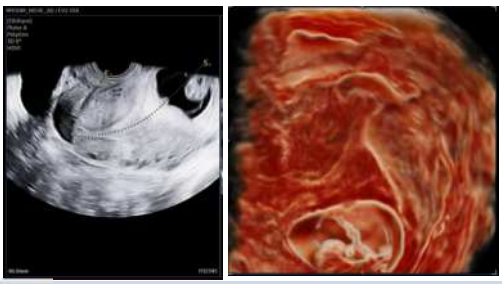


Large niche, RM < 1mm
SCDi

Expectant management

29

3 IVF
ET US guidance, difficult



30

LAPRES RCT

Infertility> 1year

Lapress Study

n=200

Lapniche | Expectant (9 months)

Completed 2 years follow-up

2018 Design

↓

2019 Started

↓

2024 Completed inclusion

↓

2026 Completed 2 year follow-up (primary endpoint)

7 years !

www.lapress.nl

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THE LANCET

Effectiveness of laparoscopic niche repair versus expectant management for reproductive outcomes in patients with unexplained infertility and large uterine caesarean scar defect (niche): single-centre randomised controlled trial (the LAPRES study)

Saskia J.M. Klein Meuleman[a,b] , Jolijn Vissers[a,b] , Rik van Eekelen[c] , Freek A. Groenman[a,b] , Prof. Ben W. Mol[d] , Emiel D. Post Uiterweer[a,b] , Prof. Wouter J.K. Hehenkamp[f,b] , Robert A. de Leeuw[b,e,*] , prof. Judith A.F. Huirne[a,b,e]

Klein Meuleman et al. The Lancet *accepted*, Klein Meuleman et al.

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Baseline

	Laparoscopic niche resection (n=103)	Expectant management (n= 97)
Age at randomisation (years)	34.0 (32.0-37.0)	35.0 (33.0-37.0)
BMI (kg/m²)	25.0 (22.5-28.1)	24.5 (23.7-27.5)
Smoker	5 (2.9%)	3 (3.1%)
History of previous CS		
- one previous CS	85 (82.5%)	77 (79.4%)
- Multiple previous CS	18 (17.5%)	20 (20.6%)
Parity	1 (1-1)	1 (1-1)
Duration of infertility at randomisation (months)	29.0 (18.0-42.0)	24.0 (14.5-34.5)
Fertility treatment since last CS		
- Ovulation induction	1 (1.0%)	9 (9.0%)
- Intrauterine insemination (IUI)	30 (29.0%)	29 (29.9%)
- In vitro fertilisation (IVF) or Intracytoplasmic sperm injection (ICSI)	23 (22.3%)	24 (24.7%)
Problems during current fertility treatment		
- Multicycle intrauterine fluid	11 (10.7%)	12 (12.4%)
- Technical difficulty with IUI or embryo transfer catheter	12 (11.7%)	10 (10.3%)
- Volume of the uterine cavity at randomisation (mm³)	506.4 (402.4-1000.0)	510.1 (403.9-1000.0)
Residual myometrium thickness at randomisation (mm)	1.9 (0.9 - 3.5)	1.1 (0.3-3.0)
Presence of adenomyosis	36 (35.0%)	43 (44.3%)

29 vs 24 months

57% vs 53% ART

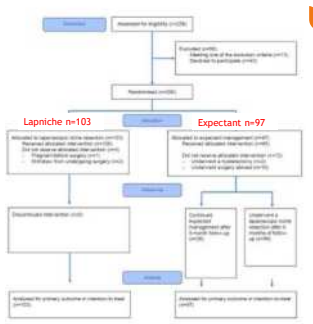
22% vs 22% diff ET/fluid

1.0 mm vs 1.1 mm

35% vs 44%

Klein Meuleman et al. The Lancet *accepted*

33



Lapniche n=103

Expectant n=97

Expectant group (n=97)

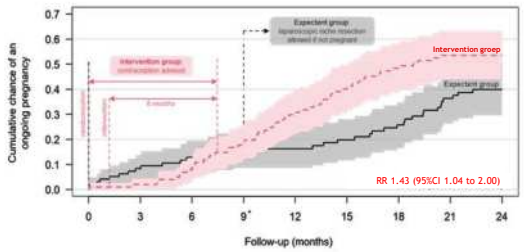
After randomisation
n=2 received a hysterectomy
n=10 received niche surgery in Belgium

After 9 months
n=59 lapniche (cross-over)
n=26 remained expectant

Klein Meuleman et al. The Lancet *accepted*

34

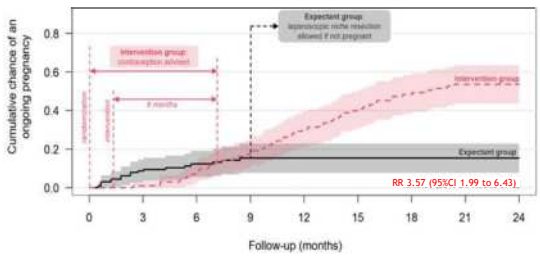
Ongoing Pregnancy rate (ITT)



Klein Meuleman et al. The Lancet *accepted*

35

Ongoing Pregnancy rate (PP)



Klein Meuleman et al. The Lancet *accepted*

36

Laparoscopic niche resection

- Lapniche is proven effective for women with a large niche and with infertility without any other causes
- Selected group: strict criteria: 10%
- Expertise Center, completed learning curve for selection, US and surgery
- Continuous quality assessment and improvement

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Conclusion

Evidence based management of Caesarean Scar niche

- Depends on symptomatology
- Do not treat if no symptoms/ CS disorder
- Proven effective for selected group
  - Infertility
  - Symptoms

But only in expert center



Take home message -> Prevent overtreatment

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Thanks

PhD students (niche)
- M.Bijdevaate
- L.vd Voet
- A.Vervoort
- S.Stegwee
- J.Vissers
- I.Jordans
- C.Verberkt
- C.Nikkels
- S.Klein Meuleman
- N.Min
- B.Post
- J.Keizerswaard
- V.Michels

Senior researchers
- R.Leeuw
- W.Hehenkamp
- F.Groenman
- E.Post-Uiterweer
- L.Juffermans
- J.Huirne
- N.Burger

International expert groups
- A.Murji (Toronto)
- Y.Zang (Shanghai)
- T.vd Bosch, D.Timmerman (Leuven)
- T.Bourne, D.Jurkovic (Londen)
- M.Mischi (TU Eindhoven)
- M.Leonardi (Canada)

CSDi group
31 experts



j.huirne@amsterdamumc.nl

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Predisposing Factors and Prevention Strategies of Cesarean Scar Niche

Sven Becker · Frankfurt Goethe University

NOVEMBER 13-16, 2026 · BOSTON · #AAGL26

1

Objectives

After listening to this lecture, audience members should

1) *Be able to define modifiable risk factors for niche development*
2) *Be able to identify non-modifiable risk factors for niche development*
3) *Be able to question available scientific data with regard to clinical relevance*

2

Prevention

3

How to Prevent? 2024

1) Avoid C-Section

4

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix

5

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus

6

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician

7

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician
5) If you are, the sutures (probably) don‘t make a difference

8

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician
5) If you are, the sutures (probably) don‘t make a difference
6) Double Layer/Single Layer – no difference

9

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician
5) If you are, the sutures (probably) don‘t make a difference
6) Double Layer/Single Layer – no difference
7) Multifilament/Polyfilament – no difference

10

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician
5) If you are, the sutures (probably) don‘t make a difference
6) Double Layer/Single Layer – no difference
7) Multifilament/Polyfilament – no difference
8) Incorporate/Do not Incorporate Endometrium – no difference

11

How to Prevent? 2024

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician
5) If you are, the sutures (probably) don‘t make a difference
6) Double Layer/Single Layer – no difference
7) Multifilament/Polyfilament – no difference
8) Incorporate/Do not Incorporate Endometrium – no difference
9) Avoid Locking Sutures

12

How to Prevent? **2024**

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician
5) If you are, the sutures (probably) don‘t make a difference
6) Double Layer/Single Layer – no difference
7) Multifilament/Polyfilament – no difference
8) Incorporate/Do not Incorporate Endometrium – no difference
9) Avoid Locking Sutures
10) Barbed Suture seems ok, too

13

Has Anything Changed?

14

The data is evolving	Pubmed-Publications	
	2024	2026
Niche + Suture	127	165
Cesarean Scar + Suture	303	355
Cesarean Defect + Suture	187	225

15

How to Prevent? **2024**

1) Avoid C-Section
2) Don‘t go too low on a dilated Cervix
3) Don‘t go too high on a non-labored Uterus
4) Be an experienced Obstetrician
5) If you are, the sutures (probably) don‘t make a difference
6) Double Layer/Single Layer – no difference
7) Multifilament/Polyfilament – no difference
8) Incorporate/Do not Incorporate Endometrium – no difference
9) Avoid Locking Sutures
10) Barbed Suture seems ok, too

16

Predisposing Factors

17

2018


REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

18

REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

Risk-Factors:

LOW position of C-Section
Incomplete Closure
Early Adhesions
Genetic Predisposition
Retroflexion
Multiple C-Sections
Prolonged Operative Time

19

REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

Risk-Factors:

LOW position of C-Section
Incomplete Closure
Early Adhesions
Genetic Predisposition
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Multiple C-Sections
Prolonged Operative Time

20

REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

Risk-Factors:

LOW position of C-Section
Incomplete Closure
Early Adhesions
Genetic Predisposition
Retroflexion
Multiple C-Sections
Prolonged Operative Time

Surgeon Competence…..

21

But…… how do you control for or measure „Surgeon Competence“?

22

All we can do is improve modifiable factors

23

All we can do is improve modifiable factors

We look for things that can improve the outcome of the average surgeon

24

REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

Surgical Technique

- Incomplete closure
- Incomplete closure of deeper muscular layer
- Unintentional or related to endometrial saving techniques

A research problem: How do you control for that? How do you randomize that?

25

REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

Uterine Suture?

26

REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

Uterine Suture?

Single-Layer myometrial Closure APPEARS to increase the risk when compared to Double-Layer

27

REVIEW ARTICLE

Isthmocele: an overview of diagnosis and treatment

Uterine Suture?

Single-Layer myometrial Closure APPEARS to increase the risk when compared to Double-Layer

Literature since 2024 seems to confirm this…..

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Key Question

Double versus Single Layer

29

Key Question

Double versus Single Layer

Don't miss the elephant: There is an emotional component to this question…..

30

OBSTETRICS

Single-layer vs double-layer uterine closure during cesarean delivery: 3-year follow-up of a randomized controlled trial (2Close study)

Carry Verberkt, MD; Sanne I. Stegwee, MD, PhD; Lucet F. Van der Voet, MD, PhD; W. Marchien Van Baal, MD, PhD; Kitty Kapiteijn, MD, PhD; Peggy M. A. J. Geomini, MD, PhD; Rik Van Eekelen, PhD; Christianne J. M. de Groot, MD; Robert A. de Leeuw, MD, PhD; Judith A. F. Huirne, MD; On behalf of the 2Close study group

AJOG 2024

Multicenter Double-Blind RTC, 32 Hospitals in the Netherlands

Primary Outcome: Live Birth Rate

31

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AJOG 2024

Multicenter Double-Blind RTC, 32 Hospitals in the Netherlands

Primary Outcome: Live Birth Rate

Secondary Outcome: Pregnancy Rate, Need for Fertility Treatment, Mode of Delivery Obstetrical and gynecologic complications

33

That is a BIG issue!

In the end, ultrasound pictures make little difference

34

That is a BIG issue!

In the end, ultrasound pictures make little difference

Niche-Size, Residual Myometrial Thickness…… who cares?

35

That is a BIG issue!

In the end, ultrasound pictures make little difference

Niche-Size, Residual Myometrial Thickness…… who cares?

Only the CLINICAL RELEVANCE matters – and that is the true endpoint of any meaningful study

36

OBSTETRICS

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AJOG 2024

2016-2018 2292 women

37

OBSTETRICS

Single-layer vs double-layer uterine closure during cesarean delivery: 3-year follow-up of a randomized controlled trial (2Close study)

Carry Verberkt, MD; Sanne I. Stegwee, MD, PhD; Lucet F. Van der Voet, MD, PhD; W. Marchien Van Baal, MD, PhD; Kitty Kapitein, MD, PhD; Peggy M. A. J. Geomini, MD, PhD; Rik Van Eekelen, PhD; Christianne J. M. de Groot, MD; Robert A. de Leeuw, MD, PhD; Judith A. F. Huirne, MD; On behalf of the 2Close study group

AJOG 2024

2016-2018 2292 women

830/1144 and 818 of 1148 responding to 3-year questionnaire

38

OBSTETRICS

Single-layer vs double-layer uterine closure during cesarean delivery: 3-year follow-up of a randomized controlled trial (2Close study)

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AJOG 2024

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830/1144 and 818 of 1148 responding to 3-year questionnaire

NO Differences: Live Birth Rates, Pregnancy Rate, Need for Fertility Treatments, Mode of Delivery, Uterine Rupture,

39

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AJOG 2024

2016-2018 2292 women

830/1144 and 818 of 1148 responding to 3-year questionnaire

NO Differences: Live Birth Rates, Pregnancy Rate, Need for Fertility Treatments, Mode of Delivery, Uterine Rupture,

High Rate of Gyn Symptoms: Spotting (30%), Dysmenorrhea (50%) in BOTH groups

40

OBSTETRICS

Single-layer vs double-layer uterine closure during cesarean delivery: 3-year follow-up of a randomized controlled trial (2Close study)

Carry Verberkt, MD; Sanne I. Stegwee, MD, PhD; Lucet F. Van der Voet, MD, PhD; W. Marchien Van Baal, MD, PhD; Kitty Kapitein, MD, PhD; Peggy M. A. J. Geomini, MD, PhD; Rik Van Eekelen, PhD; Christianne J. M. de Groot, MD; Robert A. de Leeuw, MD, PhD; Judith A. F. Huirne, MD; On behalf of the 2Close study group

AJOG 2024

Conclusion:
„This challenges the current recommendation favoring double-layer closure and we propose that surgeons can choose their preferred technique“

41

OBSTETRICS

Single-layer vs double-layer uterine closure during cesarean delivery: 3-year follow-up of a randomized controlled trial (2Close study)

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AJOG 2024

Consistent with 2 other systematic reviews

Comparable Incidences
(Niches, Uterine Dehiscence, Uterine rupture) after Single and Double-Layer Closure

42



2023

Meta-Analysis Single vs. Double-Layered Closures generally support double-layered closures for greater RMT, but NO differences in future dehiscence or rupture

43



2023

TOLAC-Study
Trial Of Labor After C-Section
No difference between single- or double-layered closure

44



2023

So: The biggest and best study does NOT find a difference in niche-formation and RMT

Most other trials do find a difference

But there appears to be no relevant clinical difference…..

45



2023

Double-Layered closure creates better outcomes on imaging

but no clinical effect with regard to future obstetric complications

!

46



2023

Reasons?
Tissue strangulation?
Increased Operative Time?

47

New Data 2024-2026

48

HHS Public Access
Author manuscript

Uterine closure after cesarean delivery: surgical technique, biological rationale, and clinical implications

2026

A robust body of experimental and clinical evidence demonstrates that restoring anatomic integrity by reapproximating uterine layers while excluding the endometrium produces stronger scars and reduces late complications.

49

HHS Public Access
Author manuscript

Uterine closure after cesarean delivery: surgical technique, biological rationale, and clinical implications

2026

In summary, current evidence suggests that while a second layer may improve residual myometrial thickness, the critical factor for optimal healing is exclusion of the endometrium/decidua. The number of layers alone does not ensure an intact scar unless myometrial approximation is achieved and endometrial inclusion is avoided.

50

HHS Public Access
Author manuscript

Uterine closure after cesarean delivery: surgical technique, biological rationale, and clinical implications

2026

Taken together, these studies indicate that interrupted suturing that excludes the endometrium is associated with the most favorable histologic and clinical outcomes. In routine obstetric practice, however, continuous suturing remains far more common, largely because it is faster, simpler, uses less suture material, and easier to perform.

51

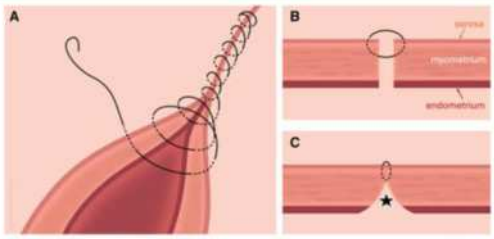


FIGURE 1. First hypothesis for the mechanism of uterine scar defect: incomplete approximation of the myometrium

(**A**) The figure shows a superficial closure of the uterine wall in a single layer, not including the endometrium (darker). Including less tissue (**B**) may reduce strangulation but could cause incomplete approximation of the myometrium (**C**). The black star shows where the myometrium has not been appropriately approximated.

52

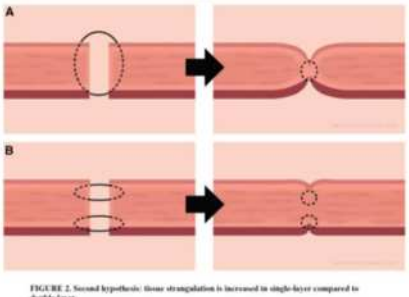


FIGURE 2. Second hypothesis: tissue strangulation is increased in single-layer compared to double-layer

The figure illustrates that a single-layer closure encompassing the entire myometrium may cause tissue contraction and strangulation of the myometrium, by tightening the suture firmly, even with the avoidance of the endometrium (**A**), whereas a 2-layer closure, with more limited inclusion, permits better approximation and reduces the risk of tissue contraction and strangulation (**B**).

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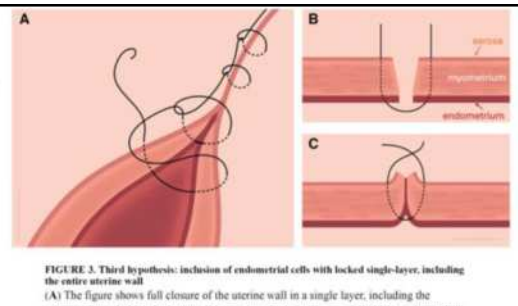


FIGURE 3. Third hypothesis: inclusion of endometrial cells with locked single-layer, including the entire uterine wall

(**A**) The figure shows full closure of the uterine wall in a single layer, including the endometrium (darker). Including all layers in a single layer, especially if the endometrium is included (**B**), leads to tissue strangulation, poor approximation of similar tissues, and inclusion of endometrial cells in the suture (**C**).

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Clinical Opinion ajog.org 2026

Reducing the long-term impact of cesarean scar defects: a focus on prevention

Sarah P. Walker, MRCOG; Helena C. Bartels, PhD; Davor Jurkovic, PhD, FRCOG; Eric Jauniaux, MD, PhD, FRCOG

Emerging Evidence….

Unlocked
Interrupted
Purse-String
Endometrium-free
Monofilament or Barbed
…… may reduce cesarean scar formation

55

Clinical Opinion ajog.org 2026

Reducing the long-term impact of cesarean scar defects: a focus on prevention

Sarah P. Walker, MRCOG; Helena C. Bartels, PhD; Davor Jurkovic, PhD, FRCOG; Eric Jauniaux, MD, PhD, FRCOG

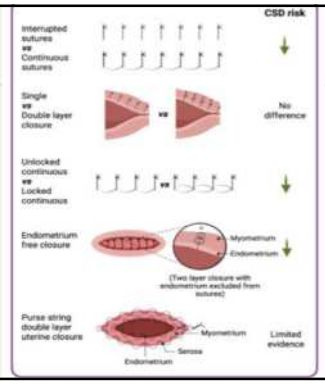
Emerging Evidence….

Unlocked
Interrupted
Purse-String
Endometrium-free
Monofilament or Barbed
…… may reduce cesarean scar formation

Not so good:
Continuous, Locked, Endometrium-inclusive

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2026



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Clinical Opinion ajog.org 2026

Reducing the long-term impact of cesarean scar defects: a focus on prevention

Sarah P. Walker, MRCOG; Helena C. Bartels, PhD; Davor Jurkovic, PhD, FRCOG; Eric Jauniaux, MD, PhD, FRCOG

Funny Question: Who has ever cleary seen the „Endometrial Layer“

58

Clinical Opinion ajog.org 2026

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Funny Question: Who has ever cleary seen the „Endometrial Layer“

Difficult, because the Endometrium disappears in Pregnancy in a process called Decidualization

59

Clinical Opinion ajog.org 2026

Reducing the long-term impact of cesarean scar defects: a focus on prevention

Sarah P. Walker, MRCOG; Helena C. Bartels, PhD; Davor Jurkovic, PhD, FRCOG; Eric Jauniaux, MD, PhD, FRCOG

Consequently, it remains unclear which tissue layer is being referred to during uterine closure at third-trimester cesarean deliveries, with the term likely

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Clinical Opinion

ajog.org

2026

Reducing the long-term impact of cesarean scar defects: a focus on prevention

Sarah P. Walker, MRCOG; Helena C. Bartels, PhD; Davor Jurkovic, PhD, FRCOG; Eric Jauniaux, MD, PhD, FRCOG

Although cesarean scar defect repair can improve chronic gynecological symptoms and subfertility, evidence in reducing perinatal complications in subsequent pregnancies remains limited, partly due to the rarity of these complications.

61

BMC Pregnancy and Childbirth

RESEARCH

Open Access

2026

A prospective comparative study of single-layer versus double-layer uterine closure techniques on cesarean scar formation

RMT at 6 months (ultrasound)

Double-layer non-locking vs. Single-layer non-locking

5.1 mm vs. 4,1 mm

Delta Operative Time

62

Original Research

2025

Single- vs double-layer uterine closure of the cesarean scar in niche development: the Nicest Study

Ha Thi Thu Nguyen, PhD; Giang Thi Tra Duong, MD; Dat Tuan Do, PhD; Thuong Thi Huyen Phan, PhD; Duc Anh Tran, MD; Toan Khac Nguyen, MD; Anh Duy Nguyen, PhD

Prospective Randomized
530
Single vs. Double layer
Unlocked continuous

6 months Ultrasound: Niche, RMT

4,3 vs. 4.0 mm
Less Large niches with RMT < 3mm

63

RESEARCH

2026

The role of cesarean section surgical techniques in the prevention of isthmocele formation: retrospective cohort study

180 patients

RMT/isthmocele presence
Saline-infusion sonohysterography at 12-24 weeks postpartum

Traditional locking double layer technique vs. unlocking, double-layer, endometrium-sparing uterine closure (First layer continuously sutured non-locking, Second layer continuous U-shaped suture)

RMT 13,9 vs. 10,18 – Lower Risk of Ithmocele (!) 39%

64

frontiers in Surgery

2026

Layered precision suturing vs. traditional double-layer closure at cesarean: a randomized trial of uterine scar healing and maternal outcomes

500
6 Month Ultrasound
3.05 vs 2.78 mm

Conclusion: LP closure with quantified tension improved 6-month uterine scar healing across multimodal imaging without introducing new safety concerns, supporting a shift from "stitch count" to a standardized, biomechanics-informed technique.

65

COMMENTARY

OPEN ACCESS

2026

'The good idea': a commentary on a decade of barbed sutures in cesarean surgery

Maria Grazia Centurioni, Fabio Barra, Francesca Olcese, Claudio Gustavino, Simone Ferrero and Franco Alessandri

ABSTRACT

Background: Minimalist cesarean techniques have delivered clear perioperative benefits, including shorter procedures, reduced tissue dissection, and reproducibility across diverse settings. As cesarean rates rise, however, an important blind spot has emerqedhow the uterine scar evolves over months and years.

66



COMMENTARY OPEN ACCESS

'The good idea': a commentary on a decade of barbed sutures in cesarean surgery

Maria Grazia Centurioni[a], Fabio Barra[a,b], Francesca Obese[c,d], Claudio Gustavino[a], Simone Ferrero[c,d] and Franco Alessandri[a]

2026

- Double-layer barbed uterine closure has been associated with more favorable imaging surrogates of healing, including thicker RMT and fewer or smaller niches; very preliminary, hypothesis-generating data suggest a possible association with greater third-trimester low uterine segment (LUS) thickness in subsequent pregnancies.

67

Conclusion - Preventive Strategies

1) Optimal level of Incision
2) Training of Surgeons
3) Full Thickness Closure of Myometrium
4) Single layer = Double Layer
5) Non-Locking Sutures
6) Endometrial inclusion – not clear

68

Happy to send you the lecture and the literature

sven.becker@ukffm.de

69

References

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- Centurioni M et al 2026
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- Nguyen HT et al 2025
- Özler M et al 2026
- Walker SP et al 2026
- Bujold E et al 2026
- Backer S et al 2023
- Verbekt C et al 2024
- Kremer T et al 2018

70

Counseling the Niche Patient: Four Cases for Discussion

Robert A. de Leeuw, MD, PhD · Ally Murji, MD, MPH

NOVEMBER 13-16, 2026 · BOSTON · #AAGL26

1

Disclosure

Robert A. de Leeuw

- **Grant / Research Support:** Medtronic (research and education grant)
- *Medtronic had no role in, and no influence on, the studies discussed in this session.*

Ally Murji

- **None**

2

Objectives

- **Counsel** a woman with an asymptomatic large niche who wishes to conceive
- **Discuss** delivery planning in a pregnancy with a known large niche
- **Recognize** the risk of overdiagnosis when scanning asymptomatic women after a cesarean
- **Evaluate** the evidence for hysteroscopic niche resection in secondary infertility

3

CASE 1 OF 4

Case 1: large niche, no complaints, wants a baby

Patient 32 years, G1P1

History Emergency CS at 9 cm dilatation, 2 years ago

Symptoms None – no spotting, no pain

Wish Wants to start trying for a second child

Ultrasound Large simple niche, RMT 0.2 mm

"Should I have it fixed before I get pregnant?"



4

CASE 1 - DISCUSSION

Case 1: what would you advise?

1. Is this a Cesarean Scar Disorder?
2. Would you offer a laparoscopic niche repair before she tries to conceive?
3. What should she know about her next pregnancy?
4. What would change your advice?



Large niche, residual myometrium 0.2 mm

Discussion: Robert de Leeuw · Ally Murji

5

CASE 2 OF 4

Case 2: large niche, now 7 weeks pregnant

Patient 35 years, G3P1 – one CS, one miscarriage

Before Large niche known, RMT 0.2 mm – not repaired

Now 7 weeks: sac in the upper cavity, not in the niche

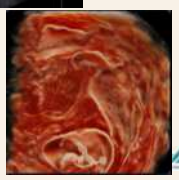
Symptoms None

Wish VBAC

"Can you reinforce my scar now?"







6

CASE 2 · DISCUSSION

Case 2: how do you counsel her?

1. How do you confirm this is not a cesarean scar pregnancy?
2. Is a trial of labor reasonable after a pre-pregnancy RMT of 0.2 mm?
3. Would you measure the lower uterine segment in the third trimester?
4. Is there a place for suturing the lower segment during pregnancy?



What we want to avoid: a uterine rupture

Discussion: Robert de Leeuw · Ally Murji

7

CASE 3 OF 4

Case 3: "Can you check my scar?"

Patient 29 years, P1

History Planned CS for breech, 6 months ago

Symptoms None; still breastfeeding, no regular cycles yet

Trigger Read that 1 in 3 women has complaints after a CS

Request An ultrasound "to see if I have a niche"

"I just want to know if my scar is OK."



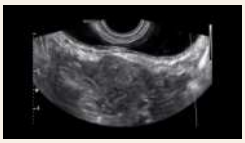
Dutch media after the CSDI consensus paper (March 2023)

8

CASE 3 · DISCUSSION

Case 3: screening – or creating a patient?

1. Would you scan her – and if so, when?
2. You find a 4 mm niche. What do you tell her?
3. Who does benefit from a niche scan after a cesarean?
4. How do we inform women without creating patients?



What you will probably find: a small niche – in 7 of 10 women

Discussion: Robert de Leeuw · Ally Murji

9

BONUS CASE · IF TIME ALLOWS

Case 4: small niche and secondary infertility

Patient 34 years, G2P1; CS 4 years ago

Infertility 18 months; normal work-up

Symptoms No spotting, no pain

TVUS Small simple niche, RMT 5 mm; intrauterine fluid mid-cycle

Plan Referred for hysteroscopic niche resection before IVF

"Will removing the niche help me get pregnant?"





Hysteroscopic view of a niche

10

BONUS CASE · DISCUSSION

Case 4: resect, repair or go straight to IVF?

1. Is this a Cesarean Scar Disorder?
2. Does hysteroscopic resection improve her chance of a live birth?
3. Hysteroscopic, laparoscopic – or straight to IVF?
4. What are the risks for her next pregnancy?



11

SESSION OVERVIEW

Four cases – one question: treat the image or the patient?

CASE 1

Large niche, no complaints, wants a baby

Repair before pregnancy?

5 min

CASE 2

Large niche, early pregnancy

TOLAC – or reinforce the scar?

5 min

CASE 3

6 months after CS, wants a scan

Screening or overdiagnosis?

5 min

CASE 4

Small niche, infertility

Hysteroscopic resection?

If time allows

12

How to Counsel Patients? Interactive Case-Based Discussion and Evidence Review

Ally Murji MD, University of Toronto

NOVEMBER 13-16, 2026 · BOSTON · #AAGL26

1

Disclosure

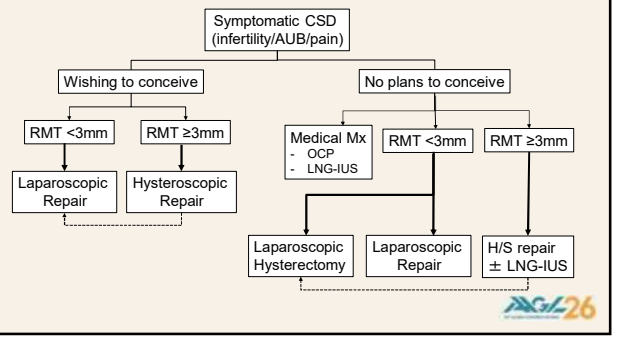
I have no financial relationships to disclose.

2

BOGC CLINICAL PRACTICE GUIDELINE

Clinical Consensus No. 463: Diagnosis and Management of Cesarean Scar Niche

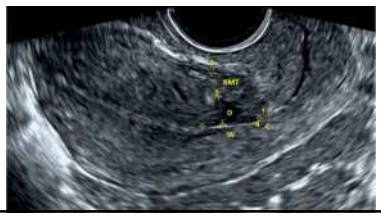
3



4

Case: Secondary Infertility

- 35 yo previous CS for second stage arrest 3 years ago
- *Minimally* symptomatic from post-menstrual spotting
- Infertility x 1 year
- Ultrasound:
  - Small CSD (<50%)
  - RMT 4mm



5

What is effectiveness of Hysteroscopic remodeling for secondary infertility?

Systematic Review
- In patients with infertility (definition?), with RMT ≥2 to ≥4mm
  - **Live birth rate 55%,** 95% CI 38%-71%, I2=81%
  - **Pregnancy rate 69%,** 95%CI 52-84%, I2=88%
    - only 1 RCT, rest Cohort
    - 10 studies
    - 383 patients
  - How did they get pregnant?
    - 51% unknown
    - 34% naturally; 13% IVF; 1.5% COH-IUI,

Verberkt et al. Fertility Sterility, July 2022

6

What is effectiveness of Hysteroscopic remodeling for secondary infertility?

TABLE 3 SUMMARY OF RESULTS AND QUALITY OF EVIDENCE ACCORDING TO THE GRADE SYSTEM FOR EFFECT OF ISTHMOCELE HYSTEROSCOPIC REPAIR ON FERTILITY

Outcome	Anticipated absolute effect (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)
	Risk with isthmocele				
Post-surgical natural conception CPR in women affected by secondary infertility	530 per 1000 (280–770)	53%	CPR 0.53 (0.28–0.77)	299 (12 observational studies)	⊕○○○ Very low
Post-surgical natural conception OPR/LBR in women affected by secondary infertility	670 per 1000 (510–820)	67%	OPR/LBR 0.67 (0.51–0.82)	189 (7 observational studies)	⊕○○○ Very low

Busnelli A, et al. Investigating the impact of isthmocele and its surgical repair on fertility: results from a systematic review and meta-analysis. Reprod Biomed Online. 2025 Jun

What if you did nothing?

7

Hysteroscopy *vs* Expectant

Only one RCT: 28 hysteroscopy vs 28 Expectant
- **Pregnancy rate** 75% vs. 32%
  - ?Live birth rate
  - How did they get pregnant?

Retrospective Comparative Cohort
- Infertility > 1year, RMT ≥2.5mm
- 72 Hysteroscopy vs 94 Expectant Mx
- **Live birth rate** 56% vs 46% (p=0.21)
  - Natural conception 49% vs 38% (p=0.29)
- **Pregnancy rate** 72% vs 56% (p=0.04)

Abdou, Ahmed Mahmoud et al. *Middle East Fertility Society Journal* 23.4 (2018): 505-509
C. He et al. *EJOGRB*, 2023.

8

Hysteroscopy Remodeling

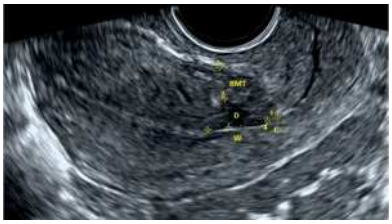
What is the downside?

- No complications reported in the SR
- 1 uterine rupture – at TOLAC
- 3 patients with early CS due to myometrial thinning/dehiscence

2018 Global Congress on Hysteroscopy:
- Surgical treatment in patients desiring future pregnancy
- Wait >3 months following repair to conceive
- Scheduled CS at 38 weeks

9

How do you counsel this patient?



Ultrasound:
- Small CSD (<50%)
- RMT 4mm

After Hysteroscopy
- Pregnancy rates ≅50-70%
- Live birth rates ≅50-70%
- Most will get pregnant naturally, some will need ART
- Compared to expectant mx, there is a signal that pregnancy rate may be higher with surgery, but not sure if live birth rate follows
- Very low quality data, 1 RCT of 28 patients
- Low surgical complications
- May increase RMT

10

Case: Secondary Infertility

- 35 yo previous CS for second stage arrest 3 years ago
- *Minimally* symptomatic from post-menstrual spotting
- Infertility x 1 year
- SIS Ultrasound:
  - large CSD (>50%)
  - RMT 1-2 mm



11

What is effectiveness of Laparoscopic resection for secondary infertility?

Systematic Review
- In patients with infertility (definition?), with RMT <3mm,
  - **Live birth rate 42%,** 95% CI 30%-55%, I2=0
  - **Pregnancy rate 48%,** 95%CI 36%-61%, I2=0
    - 4 cohort studies
    - 65 patients
  - How did they get pregnant?
    - Reported by only one study 7/8 pregnancies naturally; 1/8 ART

Verberkt et al. Fertility Sterility, July 2022

12

What is effectiveness of Laparoscopic resection for secondary infertility?

Largest Prospective Cohort with 2-year FU

- 88 patients with CSD with RMT <3mm + PMB, mid-cycle fluid accumulation or difficulty with embryo transfer or large/complex niche and RV uterus
  - **Live birth rate 53%** (47/88)
  - **Ongoing Pregnancy rate 60%** (53/88)
    - How did they get pregnant?
      - 62% naturally, 30% ART, rest unknown

Vissers et al. AOGS, July 2023

13

High live birth rates after laparoscopic isthmocele repair in infertility: a systematic review and meta-analysis

Angela Vidal[1*], James Geiger[2], Vithusha Vinayahalingam[3], Janna Pape[1], Marietta Gulz[4], Tanya Karrer[5], Michael D. Mueller[4] and Michael von Wolff[1]

Vidal A et al. Front Endocrinol (Lausanne). 2025 Apr

After Laparoscopic Niche repair:

- **Clinical Pregnancy** occurred in 44% (95% CI: 32-56%), 15 studies
- **Live Birth** occurred in 72% (95% CI, 61%–81%), 14 studies

14

What is effectiveness of LAPAROSCOPIC resection for secondary infertility?

TABLE 4 SUMMARY OF RESULTS AND QUALITY OF EVIDENCE ACCORDING TO THE GRADE SYSTEM FOR EFFECT OF ISTHMOCELE LAPAROSCOPIC REPAIR ON FERTILITY

Outcome	Anticipated absolute effect (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)
	Risk with Isthmocele				
Clinical Pregnancy by Natural Conception	450 per 1000 (330 - 570)	45%	CPR 0.45 (0.33, 0.57)	62 (3 observational studies)	⊕○○○ Very low
LBR by Natural Conception	510 per 1000 (410 - 630)	51%	CPR/LBR 0.51 (0.40 - 0.63)	202 (7 observational studies)	⊕○○○ Very low

Busnelli A, et al. Investigating the impact of isthmocele and its surgical repair on fertility: results from a systematic review and meta-analysis. Reprod Biomed Online. 2025 Jun

What if you did nothing?



15

BMJ Open Effectiveness of laparoscopic niche resection versus expectant management in patients with unexplained infertility and a large uterine caesarean scar defect (uterine niche): protocol for a randomised controlled trial (the LAPRES study)

- Large CSD (depth >50%, RMT≤3mm)
- Unexplained infertility, failed IVF or problems with fertility tx
- Randomization: Laparoscopic resection vs Expectant
- Primary outcome: Ongoing pregnancy

Vissers et al. AOGS, 2023

16

Laparoscopic resection for secondary infertility

What is the downside?

- No complications reported in the SR – reporting bias!
- Surgical risks
- Wait times
- Recovery period

17

How do you counsel this patient?



Laparoscopic resection for infertility
- Data we have is on ≅260 patients
- Pregnancy rates ≅45-50% (maybe up to 70% but not great data)
- But based on very poor data
- Balance with risks of surgery

Ultrasound:

- large CSD (>50%)
- RMT 1-2 mm

18

Case: Secondary Infertility + ART

- 35 yo previous CS for second stage arrest 3 years ago
- *Minimally* symptomatic from post-menstrual spotting
- Infertility
- SIS Ultrasound:
  - large CSD (>50%)
  - RMT 1-2 mm
- IVF with 3 failed ET
- 1 more PGS-tested embryo



19

Uterine niche is associated with adverse in vitro fertilization and intracytoplasmic sperm injection outcomes: a retrospective cohort study

Wen Tao, M.D., Ying Chen, M.D., Haixia Yao, M.M., Qingyun Tao, M.D., Lei Wang, M.D., Meng Wang, M.D., and Jing Yue, M.D.

	Niche N=179	No Niche N=2336	Propensity matched Adjusted OR
Live Birth	19%	32%	0.50
Pregnancy	29%	42%	0.55
Miscarriage	35%	25%	1.67

Large Niches:
7% had CSD (which is much lower than 50% prevalence post CS)
Mean depth 7.8mm

Fertility Sterility, March 2023

20

Niche Resection on the microbiome

Prospective cohort, 55 women with RMT ≤3 mm and a wish to conceive.
Exploratory prospective cohort: vaginal swabs pre and post-op in the mid-luteal phase, profiled by 16S rDNA sequencing and assigned to community state types (CST).

Anatomical effect

10-fold

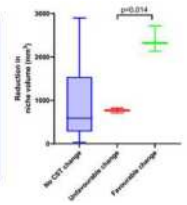
reduction in niche volume after laparoscopic niche resection — a significant anatomical effect

Microbiota response

Overall: no significant change

Resection had no significant effect on the composition of the reproductive-tract microbiota overall; CST-IV remained dominant (38.2% pre-op vs 36.4% post-op).

But favorable microbiota changes were concentrated in the women with the largest reduction in niche volume.



Take-home: laparoscopic niche resection produces a 10-fold reduction in niche volume; the microbiome does not change overall, but the women with the greatest volume reduction showed the most favourable microbiota shift — and post-operative CST-I carried the highest pregnancy rate.

Klein Meuleman SJM, van Houdt R, Schuster HJ, de Leeuw RA, Post Uiterweer ED, Huirne JAF. Effect of laparoscopic niche resection on vaginal microbiota and its relation to pregnancy rate. Eur J Obstet Gynecol Reprod Biol. 2025;311:114046.

21

Isthmocele, not cesarean section per se, reduces in vitro fertilization success: a systematic review and meta-analysis of over 10,000 embryo transfer cycles

VOL. 121 NO. 2 / FEBRUARY 2024

Annerigia Vitagliano, M.D., Ph.D.,[a] Ettore Cicinelli, M.D., Ph.D., Paola Viganò, M.D., Ph.D.,[b] Giuseppe Sorgente, M.D.,[a] Pierpaolo Nicoli, M.D.,[a] Andrea Busnelli, M.D., Ph.D.,[c,d] Miriam Dellino, M.D.,[a] Gianluca Raffaello Damiani, M.D.,[a] Sandro Gerli, M.D.,[a] and Alessandro Favilli, M.D., Ph.D.[a]

Accumulation of ICF. Intracavitary fluid was defined as the visible accumulation of fluid during the phase preceding the ET (i.e., ovarian stimulation or endometrial preparation) as
observed through ultrasound imaging.

Niche + intracavitary fluid: **uOR for live birth 0.36 (95% CI 0.18–0.75)**
Niche without fluid vs no Niche: **uOR 0.94 (95% CI 0.61–1.45)**

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Does CSN surgery improve reproductive outcomes in those undergoing ART?



Baseline Characteristics	Women with infertility (N=88)
Previous ART after last CS	66%
Previous IVF after last CS	38%
Issues with catheter for ET	28%
Intra-uterine fluid during fertility tx	43%
Median niche depth	9.4 mm
Median RMT	1.2 mm

Vissers et al. AOGS, July 2023

Live birth rate 53% (47/88)
Ongoing Pregnancy rate 60% (53/88)
- 62% naturally, 30% ART, rest unknown

23

Freeze-all beats fresh ET — and the niche is the key determinant

Xuan et al., IJGO 2026 — retrospective cohort, 412 propensity-score-matched pairs (824 cycles) after a single cesarean delivery

Overall benefit

42.2% vs 33.5%

Live birth rate per transfer, FET vs fresh ET (OR 1.45, 95% CI 1.12–1.88, P = 0.006).

Clinical pregnancy 51.5% vs 41.0% (P = 0.003); implantation 35.8% vs 28.6% (P < 0.001).

FET independently protective for live birth after adjustment: aOR 1.48 (1.15–1.92), P = 0.003.

Niche vs intact scar

OR 2.15 with a niche

In women with a sonographically confirmed niche, FET more than doubled the odds of live birth vs fresh ET (95% CI 1.45–3.20, P < 0.001).

With an intact scar, no significant benefit: OR 1.18 (0.95–1.48), P = 0.125.

Proposed mechanism: supraphysiological COS hormones plus niche inflammation — a "double hit" on receptivity.

Take-home: in women with a previous cesarean, freeze-all/FET improves live birth — but the benefit is concentrated in those with a niche (OR 2.15) and is negligible with an intact scar. Map the scar with 3D TVUS or SIS before IVF.

Xuan H, Tang Z, Hong M, et al. Optimizing embryo transfer strategies for women with previous cesarean delivery: a propensity score-matched comparison of fresh versus frozen-thawed cycles. Int J Gynecol Obstet. 2026. DOI: 10.1002/ijgo.71236

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How do you counsel this patient?



Ultrasound:
- large CSD (>50%)
- RMT 1-2 mm

- IVF with 3 failed ET
- 1 more PGS-tested embryo

With large CSD + IVF
- chances of pregnancy are lower (≅50%)
- miscarriage rate is higher
- difficulties with catheter insertion
- we have **very preliminary evidence** that surgical correction of large defects may be beneficial
- May alter the microbiome
- Consider FET vs fresh

- Balance risks of surgery, wait times, recovery period, ?experimental

25

Case: Nervous Patient

- 35 yo previous CS for second stage arrest 3 years ago – told it was a difficult CS. Wants to get pregnant again ASAP.
- *Minimally* symptomatic from post-menstrual spotting
- Prompted an Ultrasound:
  - large CSD (>50%)
  - RMT 1-2 mm

Her doctor told her not to get pregnant until this is fixed due to risk of pregnancy complications



26

Worry About Uterine Rupture

Bujold et al 2009

- Prospective cohort study in women with previous C/S
- Low Uterine Segment (LUS) thickness measured <2.3mm @35-38 wks associated with uterine rupture

What is the risk of mid trimester uterine rupture in our patient?



27

Transvaginal Ultrasound

- Isthmocele extending to serosa 2.6x1.0x1.0cm
- No significant myometrium seen



Edwards & Mathur, JMIG 2021

28

Later presentation… (18 weeks)



29

Evolution (22 weeks)



30

Worry about Cesarean Scar Pregnancy

	CSP incidence
All deliveries	1 in 1800-2600
Previous CS	1 in 531
National UK cohort	1.5 in 10,000
Systematic Review of CSD repairs	1%

- Baseline incidence extremely low
- No data on CSD morphology and risk of CSP
- Highest reported risk after CSD repair
- Access to early imaging

Noel Laure et al, Current Opinion, 2022
HM Harb et al, BJOG, 2018
Verberkt et al. Fertility Sterility, July 2022

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Risk of PAS

Cesarean Delivery	First	2nd	3rd	4th	5th
Placenta Accreta (%)	0.25	0.31	0.57	2.1	2.3
Hysterectomy (%)	0.65	0.42	0.9	2.4	3.5

Silver et al., Green J, 2006

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How do you counsel this nervous patient?



Ultrasound:
- large CSD (>50%)
- RMT 1-2 mm

Adverse obstetric outcomes
- Real risk of uterine rupture if labours
- Risk of mid-trimester rupture unknown but likely miniscule
- Discuss elective repeat CS
- Risk of CSP and PAS are low but vigilance is suggested
  - Early first trimester US
  - If anterior previa – placental scan to screen for PAS
- Risks of adverse outcomes also present after surgical CSD repair
  - Uterine rupture with Hysteroscopy
  - CSP 1%

33

Clinical Consensus No. 463: Diagnosis and Management of Cesarean Scar Niche

J Obstet Gynaecol Can 2025;47(11):103143

SUMMARY STATEMENT

Current data do not support surgical management of cesarean scar niche to improve pregnancy outcomes (moderate).

RECOMENDATIONS

Patients should be counselled that surgical management of cesarean scar niche solely to prevent adverse pregnancy outcomes is not recommended (conditional, low).

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Clinical Consensus No. 463: Diagnosis and Management of Cesarean Scar Niche

J Obstet Gynaecol Can 2025;47(11):103143

RECOMENDATIONS

Patients with cesarean scar niche should be counselled about future risk of cesarean scar pregnancy and placenta accreta spectrum disorder and should be encouraged to obtain an early pregnancy ultrasound in subsequent pregnancies. Otherwise, monitoring of the pregnancy and delivery should not be influenced by the presence of a niche diagnosed before pregnancy (good practice point).

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Prevention

RECOMMENDATION

In patients undergoing cesarean delivery in labour with advanced cervical dilatation (≥5cm), providers should consider performing the **hysterotomy incision above the vesicouterine junction** to reduce the risk of niche formation and its associated consequences *(conditional, moderate)*.

In patients undergoing elective cesarean delivery or cesarean in early labor, providers should consider closing the hysterotomy in **an unlocked double-layer fashion, where the first layer does not incorporate the endometrium.** This technique has been associated with a reduced risk of CSN and its sequelae *(conditional, moderate)*.

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AAGL 2026 GLOBAL CONGRESS
POSTGRADUATE COURSE:
C-Section Scar Ectopic & Niche Evaluation and Management
AAGL 2026
GLOBAL CONGRESS
BOSTON, MASSACHUSETTS
Surgical Tips and Tricks for Niche Repair:
Hysteroscopic and Laparoscopic Approaches
LACEY C. BRENNAN
MD, MBE, MBA, FRCSC
Minimally Invasive Gynecologic Surgeon
Department of Obstetrics & Gynecology
Cumming School of Medicine, University of Calgary
Peter Lougheed Centre, Calgary, Canada

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AAGL 2026 GLOBAL CONGRESS
POSTGRADUATE COURSE:
C-Section Scar Ectopic & Niche Evaluation and Management
AAGL 2026
GLOBAL CONGRESS
BOSTON, MASSACHUSETTS
Objectives
1
SELECT
Hysteroscopic vs laparoscopic approach
2
RESECT
Tips for hysteroscopic repair
3
RECONSTRUCT
Tips for laparoscopic repair
4
TROUBLESHOOT
Pitfalls & surgical pearls

2


AAGL 2026 GLOBAL CONGRESS
POSTGRADUATE COURSE:
C-Section Scar Ectopic & Niche Evaluation and Management
Cesarean Scar Niche
WHO NEEDS TREATMENT?
Patient with Cesarean Scar Niche
Symptomatic
Not desiring pregnancy
AUB/spotting, pelvic pain, dysmenorrhea
Symptomatic
Desiring pregnancy
AUB/spotting, pelvic pain, dysmenorrhea, infertility
Asymptomatic
Medical Management
First-line therapy (e.g., COCs, LNG-IUD)
Follow-up and reassess if symptoms persist
If symptoms persist
Surgical Management
Indicated to improve symptoms and optimize reproductive outcomes
Expectant Management
Reassurance and follow-up
If we operate, how do we choose the right surgical approach?

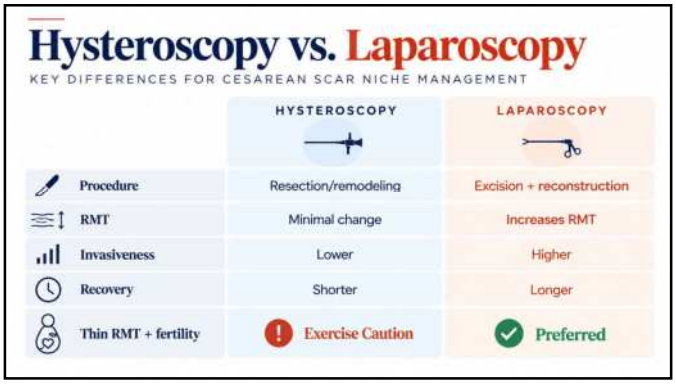
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AAGL 2026 GLOBAL CONGRESS
POSTGRADUATE COURSE:
C-Section Scar Ectopic & Niche Evaluation and Management
Resect or Reconstruct?
TWO DIFFERENT OPERATIONS FOR DIFFERENT GOALS
HYSTEROSCOPY
Resect & Remodel
Treats the defect from within the cavity
Improves drainage
Removes fibrotic tissue and cauterizes vessels
VS.
LAPAROSCOPY
Excise & Reconstruct
Excises the fibrotic defect
Restores myometrial thickness and anatomy
Rebuilds the uterine wall
The operation should match the myometrium you have — and the myometrium you need.

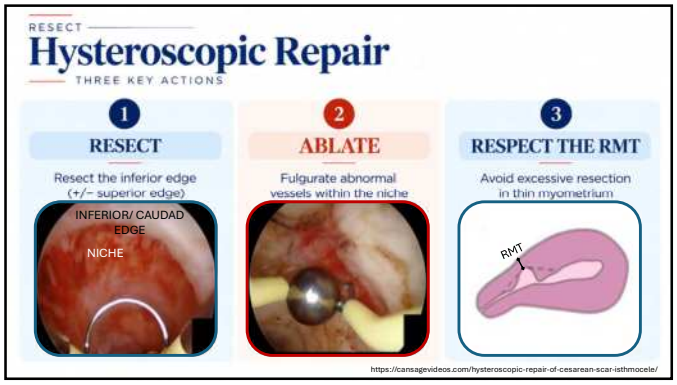
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SELECT
Choosing the Approach
BASED ON RESIDUAL MYOMETRIAL THICKNESS (RMT) AND REPRODUCTIVE GOALS
Desires future pregnancy?
No
Yes
RMT ≥ 3 mm
(2.5 – 3.5 mm)
HYSTEROSCOPIC
Resect & Remodel
RMT ≥ 3 mm
(2.5 – 3.5 mm)
HYSTEROSCOPIC
Resect & Remodel
RMT < 3 mm
(2.5 – 3.5 mm)
LAPAROSCOPIC
Excise & Reconstruct
There is no universally accepted RMT cutoff.
Published thresholds generally fall around 3 mm (2.5 – 3.5 mm), and should be interpreted in the context of individual patient factors and goals.
Future fertility increases the importance of preserving/restoring myometrial integrity.

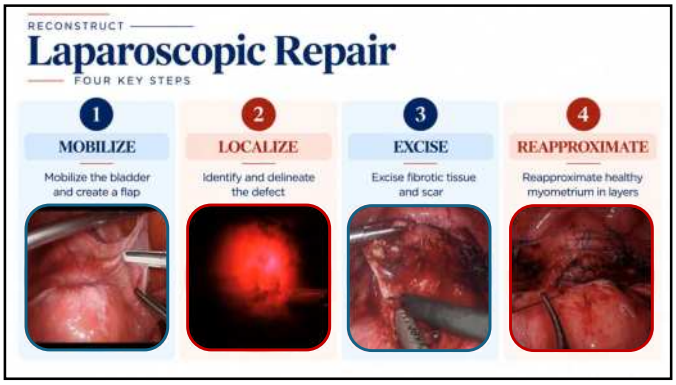
5


Hysteroscopy vs. Laparoscopy
KEY DIFFERENCES FOR CESAREAN SCAR NICHE MANAGEMENT
HYSTEROSCOPY
LAPAROSCOPY
Procedure
Resection/remodeling
Excision + reconstruction
RMT
Minimal change
Increases RMT
Invasiveness
Lower
Higher
Recovery
Shorter
Longer
Thin RMT + fertility
Exercise Caution
Preferred

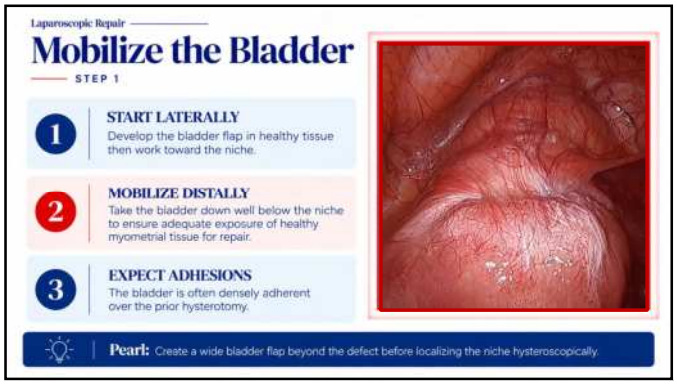
6


RESECT
Hysteroscopic Repair
THREE KEY ACTIONS
1
RESECT
Resect the inferior edge (+/− superior edge)
INFERIOR/ CAUDAD EDGE
NICHE
2
ABLATE
Fulgurate abnormal vessels within the niche
3
RESPECT THE RMT
Avoid excessive resection in thin myometrium
RMT
https://cansagevideos.com/hysteroscopic-repair-of-cesarean-scar-isthmocele/

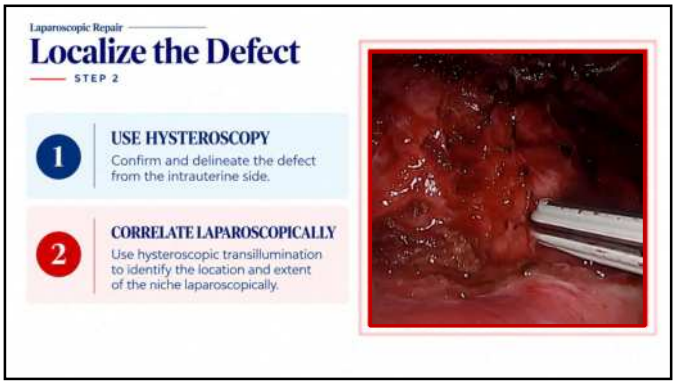
7


RECONSTRUCT
Laparoscopic Repair
FOUR KEY STEPS
1
MOBILIZE
Mobilize the bladder and create a flap
2
LOCALIZE
Identify and delineate the defect
3
EXCISE
Excise fibrotic tissue and scar
4
REAPPROXIMATE
Reapproximate healthy myometrium in layers

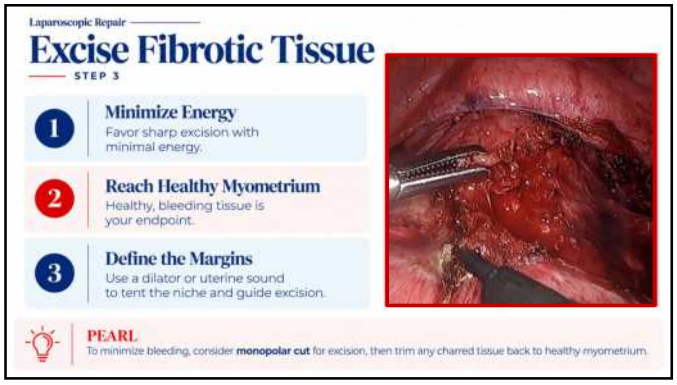
8


Laparoscopic Repair
Mobilize the Bladder
STEP 1
1
START LATERALLY
Develop the bladder flap in healthy tissue then work toward the niche.
2
MOBILIZE DISTALLY
Take the bladder down well below the niche to ensure adequate exposure of healthy myometrial tissue for repair.
3
EXPECT ADHESIONS
The bladder is often densely adherent over the prior hysterotomy.
Pearl: Create a wide bladder flap beyond the defect before localizing the niche hysteroscopically.

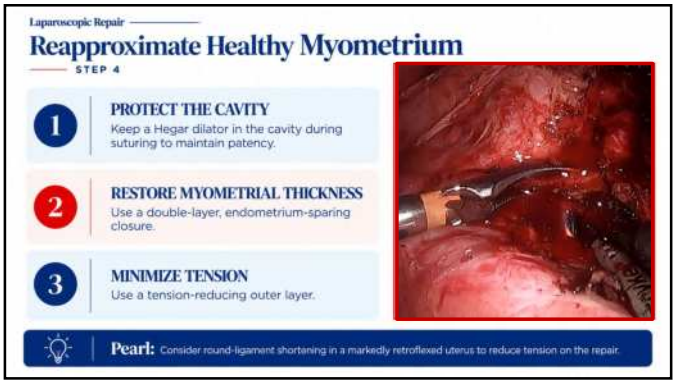
9


Laparoscopic Repair
Localize the Defect
STEP 2
1
USE HYSTEROSCOPY
Confirm and delineate the defect from the intrauterine side.
2
CORRELATE LAPAROSCOPICALLY
Use hysteroscopic transillumination to identify the location and extent of the niche laparoscopically.

10


Laparoscopic Repair
Excise Fibrotic Tissue
STEP 3
1
Minimize Energy
Favor sharp excision with minimal energy.
2
Reach Healthy Myometrium
Healthy, bleeding tissue is your endpoint.
3
Define the Margins
Use a dilator or uterine sound to tent the niche and guide excision.
PEARL
To minimize bleeding, consider monopolar cut for excision, then trim any charred tissue back to healthy myometrium.

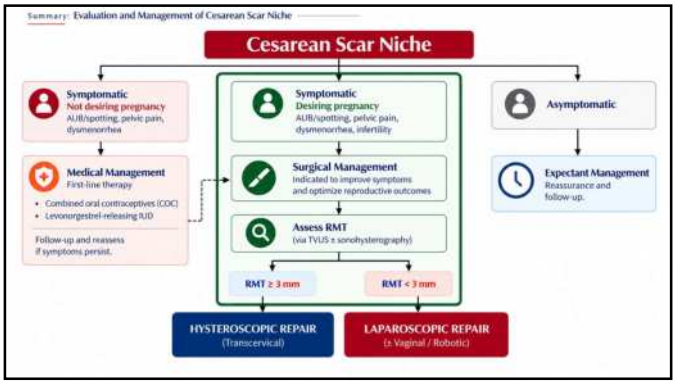
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Laparoscopic Repair
Reapproximate Healthy Myometrium
STEP 4
1
PROTECT THE CAVITY
Keep a Hegar dilator in the cavity during suturing to maintain patency.
2
RESTORE MYOMETRIAL THICKNESS
Use a double-layer, endometrium-sparing closure.
3
MINIMIZE TENSION
Use a tension-reducing outer layer.
Pearl: Consider round-ligament shortening in a markedly retroflexed uterus to reduce tension on the repair.

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Laparoscopic Repair
Post-Repair Counseling
Evidence is limited and largely consensus-based (no RCTs).
1
DELAY CONCEPTION ~3–6 MONTHS
Use reliable contraception in the interim.
2
CONFIRM HEALING AT ~3–6 MONTHS
Reassess the repair and residual myometrial thickness with TVUS.
3
SET REALISTIC EXPECTATIONS
Symptom improvement is common; fertility benefit remains uncertain and recurrence is possible.
4
NEXT PREGNANCY
Early ultrasound to confirm pregnancy location and exclude cesarean scar pregnancy.

13


Summary: Evaluation and Management of Cesarean Scar Niche
Cesarean Scar Niche
Symptomatic
Not desiring pregnancy
AUB/spotting, pelvic pain, dysmenorrhea
Medical Management
First-line therapy
Combined oral contraceptives (COC)
Levonorgestrel-releasing IUD
Follow-up and reassess if symptoms persist.
Symptomatic
Desiring pregnancy
AUB/spotting, pelvic pain, dysmenorrhea, infertility
Surgical Management
Indicated to improve symptoms and optimize reproductive outcomes
Assess RMT
(via TVUS ± sonohysterography)
RMT ≥ 3 mm
RMT < 3 mm
HYSTEROSCOPIC REPAIR
(Transcervical)
LAPAROSCOPIC REPAIR
(± Vaginal / Robotic)
Asymptomatic
Expectant Management
Reassurance and follow-up.

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Amsterdam UMC
Universitair Medische Centra

Implementation and Standardization of Diagnostics and Treatment of CS Disorders

Prof. dr. Judith Huirne and as. Prof. dr. Robert de Leeuw



1

Disclosures

Research Grants

- HYSNICHE Trial (ZonMw)
- 2 Close trial (ZonMw)
- RCT barbed sutures (Metronic)

no role in, and no influence on, the studies discussed in this presentation



2

Advanced sonographic scanning

1. Are sonographic findings important for indication & type of therapy?
2. US biomarkers to predict outcomes after surgery?



3

Advanced scanning

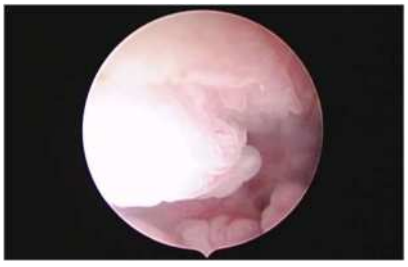
- Exclude other pathology (severe adenomyosis, DIE)
- Complex?
- Low location (below VVF, distance between lower part niche and external os)
- RMT?
- Lateral extension (outside the cervical border?, relation with uterine artery
- Adhesions?

Verberkt et al. Ultrasound Obstet Gynecol. 2022

4

Advanced scanning

Complex?



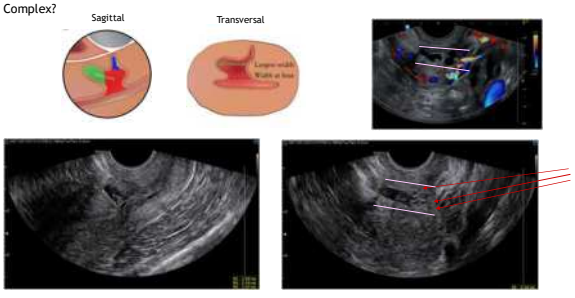
5

Advanced scanning

Complex?

Sagittal

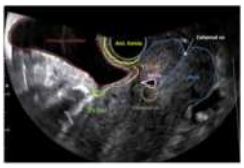
Transversal



6

Advanced scanning

Localisation?



Below vesico-vaginal fold



Distance to external os

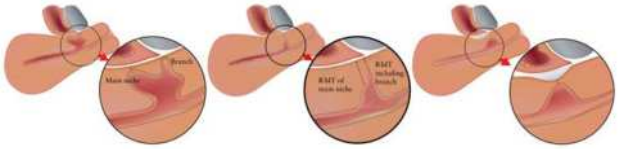


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Advanced scanning

RMT Main and branches

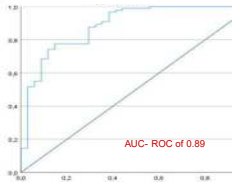
Fibrosis (reversed niche)



8

Who will benefit from a laparoscopic niche resection?

>50% reduction in spotting



Prospective cohort n=130

Predictive for reducing spottingdays > 50%

- Total spotting days
- Niche volume

Predictive for anatomical failures (low AUC)

- Niche volume >1600 mm³
- Very low complex niches

-> Collect data!



Vissers et al. submitted

9

Can we predict fertility outcome after lapniche?

- Insufficient data
- 600 lapniches
- 5% anatomic failure (expertise center)

- Failure reate was associated
  - Very low located niche (complex with many branches)
  - Very wide niche
  - Severe adenomyosis/or DIE

-> Prognostic model for fertilty outcomes after lapniche: work in progress

10

1 Standardization

- Treatment

2 Safe implementation



11

IDEAL phase 2a

after 10 year of experience and n=100
Description and optimization of the technique







Huirne, de Leeuw et al Eur J Obstet Gynecol Reprod Biol. 2017

12

Translumination



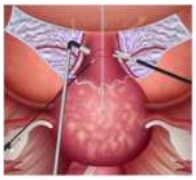


Huirne, de Leeuw et al Eur J Obstet Gynecol Reprod Biol. 2017

13

Adhaesiolysis





- Dissection of the uterine aeries
- Uterotomy
- Cutting out all fibrosis

Huirne, de Leeuw et al Eur J Obstet Gynecol Reprod Biol. 2017

14

Uterine closure: 2 layers



1st layer sliding knots



2nd layer + baldi

Huirne, de Leeuw et al Eur J Obstet Gynecol Reprod Biol. 2017

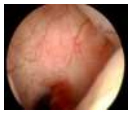
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Hysteroscopic control





Detect branches/
Double niches





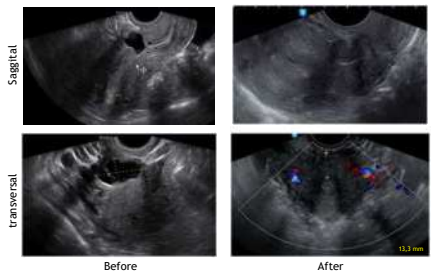
Evaluate results

Before After

Huirne, de Leeuw et al Eur J Obstet Gynecol Reprod Biol. 2017

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US evaluation



Before After

Vervoort et al. 2018 BJOG

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Optimal technique?

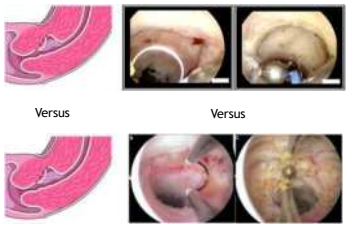
- Laparoscopic or robotic niche resection
  - Closure techniques
  - Suspension ligaments
  - 30 degree versus 90 degree flex scope
  - Needle marking methode
  - Adhesion prevention

No comparative studies

18

Optimal technique?

- Hysniche



Versus

Versus

No comparative studies

19

Optimal technique?

- Hysniche niche resection
- Vaginal niche resection
- Robotic niche resection

No standardization

No comparative studies concerning techniques within an approach

No comparative studies between approaches

20

1 Standardization

- **Diagnosis**
- **Treatment**

2 Safe implementation



21

Laparoscopic niche resection

- Selected group: strict criteria: 10%
- Expertise Center, completed learning curve for selection, US and surgery
- Continuous quality assessment and improvement

22

IDEAL Framework LapNiche



Klein Meuleman et al. Lancet Surgery and Anaesthesiology *accepted*

23

THE LANCET
Surgery & Anaesthesiology

Appropriate implementation of laparoscopic niche repair in women with a large caesarean scar defect (uterine niche) and unexplained infertility

Saskia J.M. Klein Meuleman[a,b], Charlotte Nikkels[a,b], Emiel D. Post Uiterweer [a,b], Freek A. Groenman[a,b], Prof. Wouter J.K. Hehenkamp[a,b], CSDI Study Group*, Prof. Judith A.F. Huirne[b,c,**], Robert A. de Leeuw[b,c,**]

Klein Meuleman et al. The Lancet Surgery & Anaesthesiology *accepted*

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TEN LAPNICHE "COMMANDMENTS"

-> Guidelines ESGE/ESHRE/ISUOG

1. **Diagnosis US (advanced US)**
2. Patient selection and fertility and preoperative work-up
3. Patient counseling
4. Recommendations to prevent complications (surgical challanges)
5. Recommendations to prevent overtreatment
6. Centralized care (few centers of excellence)
7. Recommend structured training program
8. Centralised review of indications for surgery
9. International collaboration network
10. Prospective registries: outcomes including pre- and post op US, pregnancy outcomes

Klein Meuleman et al. Lancet Surgery and Anaesthesiology *accepted*

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→ **Prognostic models and comparative studies**

Klein Meuleman et al. Lancet Surgery and Anaesthesiology *accepted*

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Amsterdam Imaging and surgical Training Center



NICHE training center

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Conclusion



Take home message: prevent overtreatment and only in expert centers

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Thanks

PhD students (niche)
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- C.Verberkt
- C.Nikkels
- S.Klein Meuleman
- N.Min
- B.Post
- J.Keizerswaard
- V.Michels

Senior researchers
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- W.Hehenkamp
- F.Groenman
- E.Post-Uiterweer
- L.Juffermans
- J.Huirne
- N.Burger

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- Y.Zang (Shanghai)
- T.vd Bosch, D.Timmerman (Leuven)
- T.Bourne, D.Jurkovic (Londen)
- M.Mischi (TU Eindhoven)
- M.Leonardi (Canada)

CSDi group
31 experts



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Minimally Invasive Approach to Cesearean Scar Pregnancy

Ally Murji MD, University of Toronto

NOVEMBER 13-16, 2026 · BOSTON · #AAGL26

1

Learning Objectives

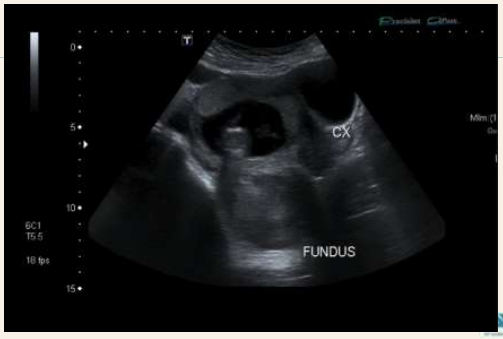
- Identify the two types of CSP
- Describe management options for the various CSP types

2

Sonographic Criteria

- Pregnancy located in the anterior uterine isthmus
- Empty uterine cavity with no contact with the GS
- Empty cervical canal
- Discontinuity in the anterior myometrium (or absence of myometrium between the GS and bladder)
- No suspicious adnexal masses or FF

3



4

There are 2 types of CSP

- **TYPE 1** – grows into the uterus
- **TYPE 2** – grows into the abdomen

The type of CSP affects management

5



6

Type 1



7

Type 2



8

Type 1 vs. Type 2 CSP



Type 1 CSP:
Growth into the uterus



Type 2 CSP:
Growth toward the abdomen

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Natural Progression



Type 1 CSP



Type 2 CSP

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Case 1: Midtrimester Hemoperitoneum

39 year-old G7P3 with 3 previous cesarean sections presented to a community hospital at 17[2] weeks gestation.

- Acute abdominal pain and drop in hemoglobin.
- Inconclusive Computed Tomography and ultrasound. Received 1 unit pRBC and taken for exploratory laparoscopy by General Surgery for presumptive diagnosis of appendicitis.

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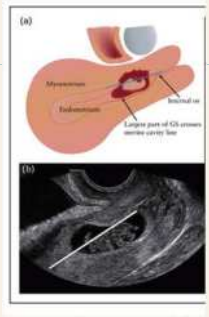
Cansagevideos.com



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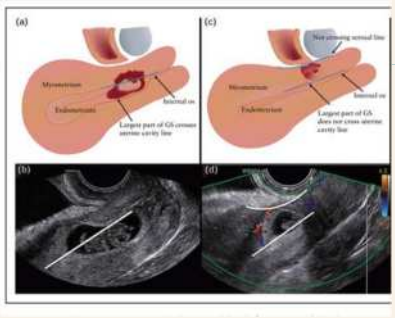
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Type 1

Jordans et al 2022

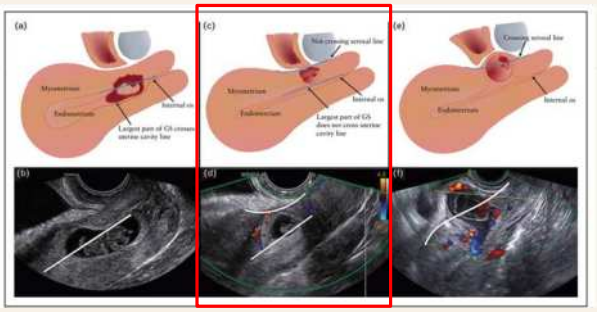
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Type 1

Jordans et al 2022

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Type 1

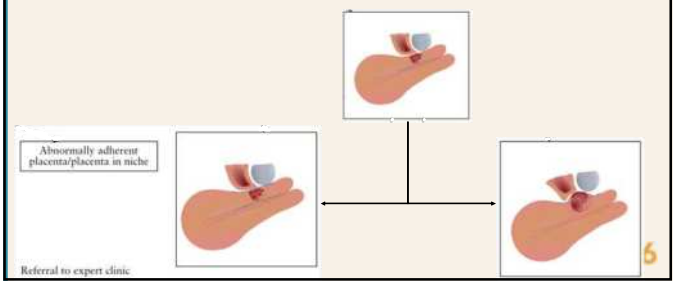
Type 2

Jordans et al 2022

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Classification is fluid

Classification of CSP is not fixed and may change with advancing gestation



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Management

- Hemodynamic stability
- Gestational Age
- Viability of pregnancy
- Residual myometrial thickness
- Vascularity around the pregnancy
- Patient preferences
- Physician experience
- Institutional resources

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SMFM Recommendations 2022

Society for Maternal-Fetal Medicine

SMFM Consult Series

smfm.org

Society for Maternal-Fetal Medicine Consult Series #63: Cesarean scar ectopic pregnancy

Society for Maternal-Fetal Medicine (SMFM); Russell Miller, MD; and Cynthia Gyamfi-Bannerman, MD; Publications Committee*

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SMFM Recommendations 2022

1. Recommend against expectant management. Can lead to live birth but at expense of severe maternal morbidity (Grade 1B)
2. Systemic MTX alone should not be used (Grade 1C)
3. Surgical options (Grade 2C):
   - Operative resection (TV or L/S)
   - USS-guided D+C
   - Local MTX +/- other treatment (UAE, systemic MTX)
4. Counsel about risk of recurrence (up to 20%) (Grade 1C)

Grade 1: Strong Recommendation; Grade 2: Weak Recommendation

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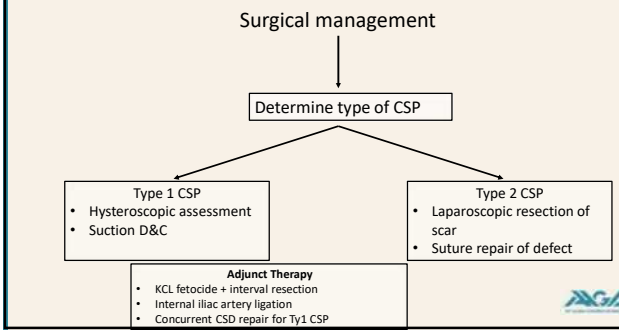
Surgical Management Algorithm for Caesarean Scar Pregnancy

Jessica Papillon-Smith, MD; Mara L. Sobel, MD, MSc; Kirsten M. Niles, MD, PhD; M. Jonathon Solnik, MD; Ally Murji, MD, MPH

Department of Obstetrics and Gynaecology, Mount Sinai Hospital, University of Toronto, Toronto, ON

JOGC 2017

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Type 2

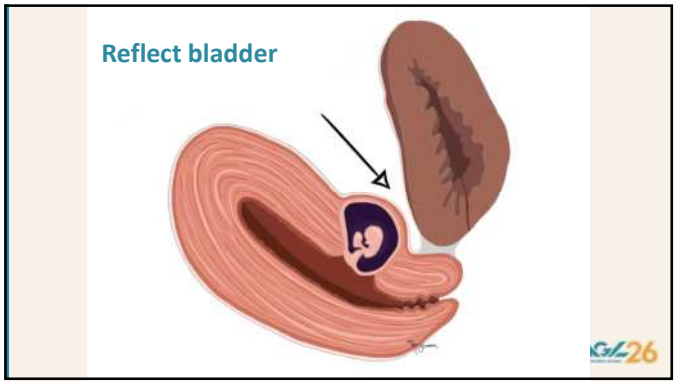


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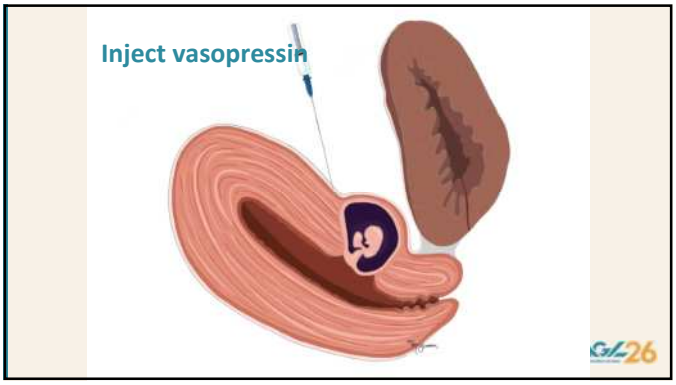
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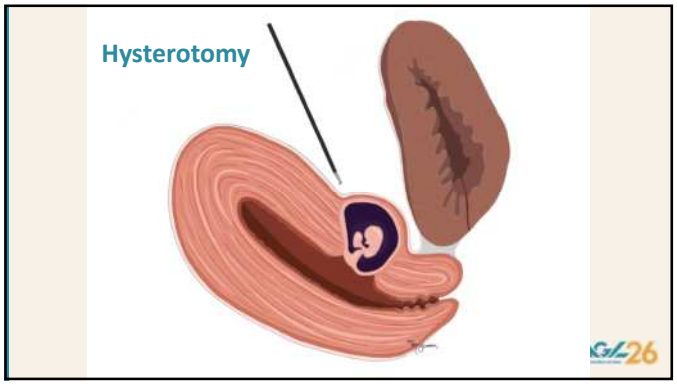
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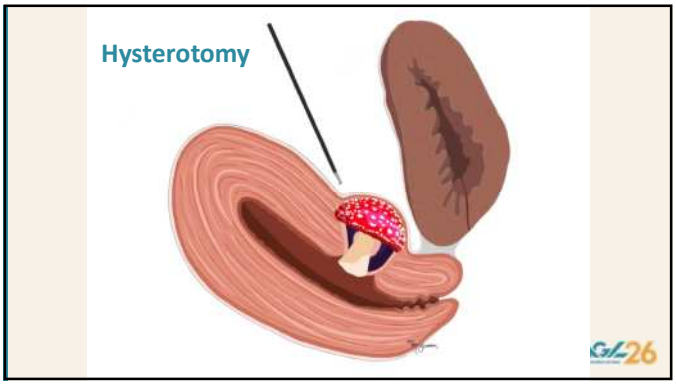
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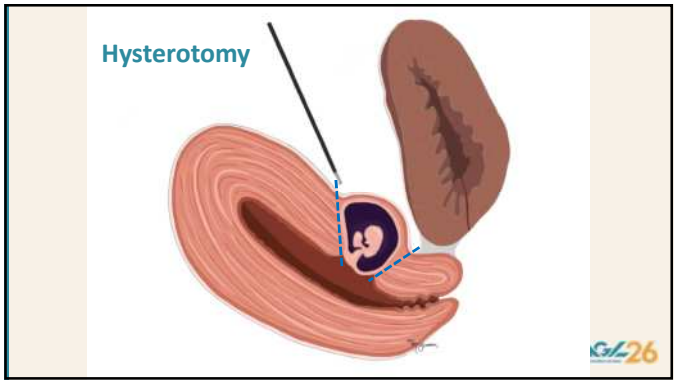
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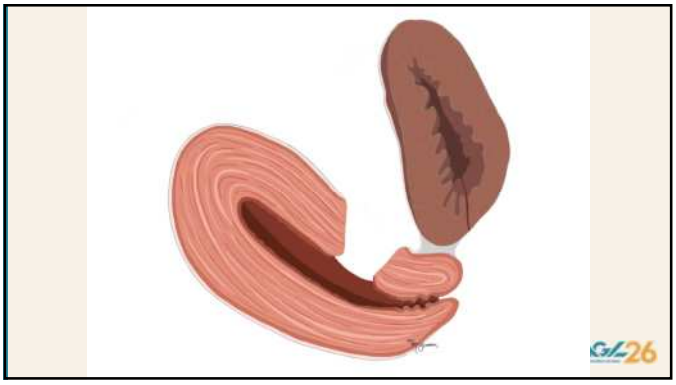
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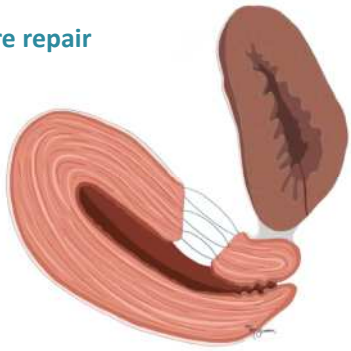


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Suture repair



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Take Home Messages

1. Two types of CSP – Type 1 (uterine), Type 2 (abdominal) and Hybrid
2. The type affects management
3. Management is predominantly surgical

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CULTURAL AND LINGUISTIC COMPETENCY & IMPLICIT BIAS

The California Medical Association (CMA) outlines standards for Cultural Linguistic Competency and Implicit Bias in CME. The goal of the standards is to support the role of accredited CME in advancing diversity, health equity, and inclusion in healthcare. These standards are relevant to ACCME-accredited, CMA-accredited, and jointly accredited providers located in California. AAGL is ACCME-accredited and headquartered in California.

CMA developed the standards in response to California legislation (Business and Professions (B&P) Code Section 2190.1), which directs CMA to draft a set of standards for the inclusion of cultural and linguistic competency (CLC) and implicit bias (IB) in accredited CME.

The standards are intended to support CME providers in meeting the expectations of the legislation. CME provider organizations physically located in California and accredited by CMA CME or ACCME, as well as jointly accredited providers whose target audience includes physicians, are expected to meet these expectations which began on January 1, 2022. AAGL has been proactively adopting processes that meet and often exceed the required expectations of the legislation.

CMA CME offers a variety of resources and tools to help providers meet the standards and successfully incorporate CLC & IB into their CME activities, including FAQ, definitions, a planning worksheet, and best practices. These resources are available on the CLC and IB standards page on the CMA website.

Important Definitions:

Cultural and Linguistic Competency (CLC) – The ability and readiness of health care providers and organizations to humbly and respectfully demonstrate, effectively communicate, and tailor delivery of care to patients with diverse values, beliefs, identities and behaviors, in order to meet social, cultural and linguistic needs as they relate to patient health.

Implicit Bias (IB) – The attitudes, stereotypes and feelings, either positive or negative, that affect our understanding, actions and decisions without conscious knowledge or control. Implicit bias is a universal phenomenon. When negative, implicit bias often contributes to unequal treatment and disparities in diagnosis, treatment decisions, levels of care and health care outcomes of people based on race, ethnicity, gender identity, sexual orientation, age, disability and other characteristics.

Diversity – Having many different forms, types or ideas; showing variety. Demographic diversity can mean a group composed of people of different genders, races/ethnicities, cultures, religions, physical abilities, sexual orientations or preferences, ages, etc.

Direct links to AB1195 (CLC), AB241 (IB), and the B&P Code 2190.1:

Bill Text – AB-1195 Continuing education: cultural and linguistic competency.
Bill Text – AB-241 Implicit bias: continuing education: requirements.
Business and Professions (B&P) Code Section 2190.1

CLC & IB Online Resources:

Diversity-Wheel-as-used-at-Johns-Hopkins-University-12.png (850×839) (researchgate.net)
Implicit Bias, Microaggressions, and Stereotypes Resources | NEA
Act, Communicating, Implicit Bias (racialequitytools.org)
https://www.contemporaryobgyn.net/view/overcoming-racism-and-unconscious-bias-in-ob-gyn
https://pubmed.ncbi.nlm.nih.gov/34016820/
https://hr.ucdavis.edu/departments/learning/certificate/implicit-bias
https://pmc.ncbi.nlm.nih.gov/articles/PMC7011228/