

Ultrasound-guided risk stratification and tailored management of caesarean scar pregnancy: a three-case series

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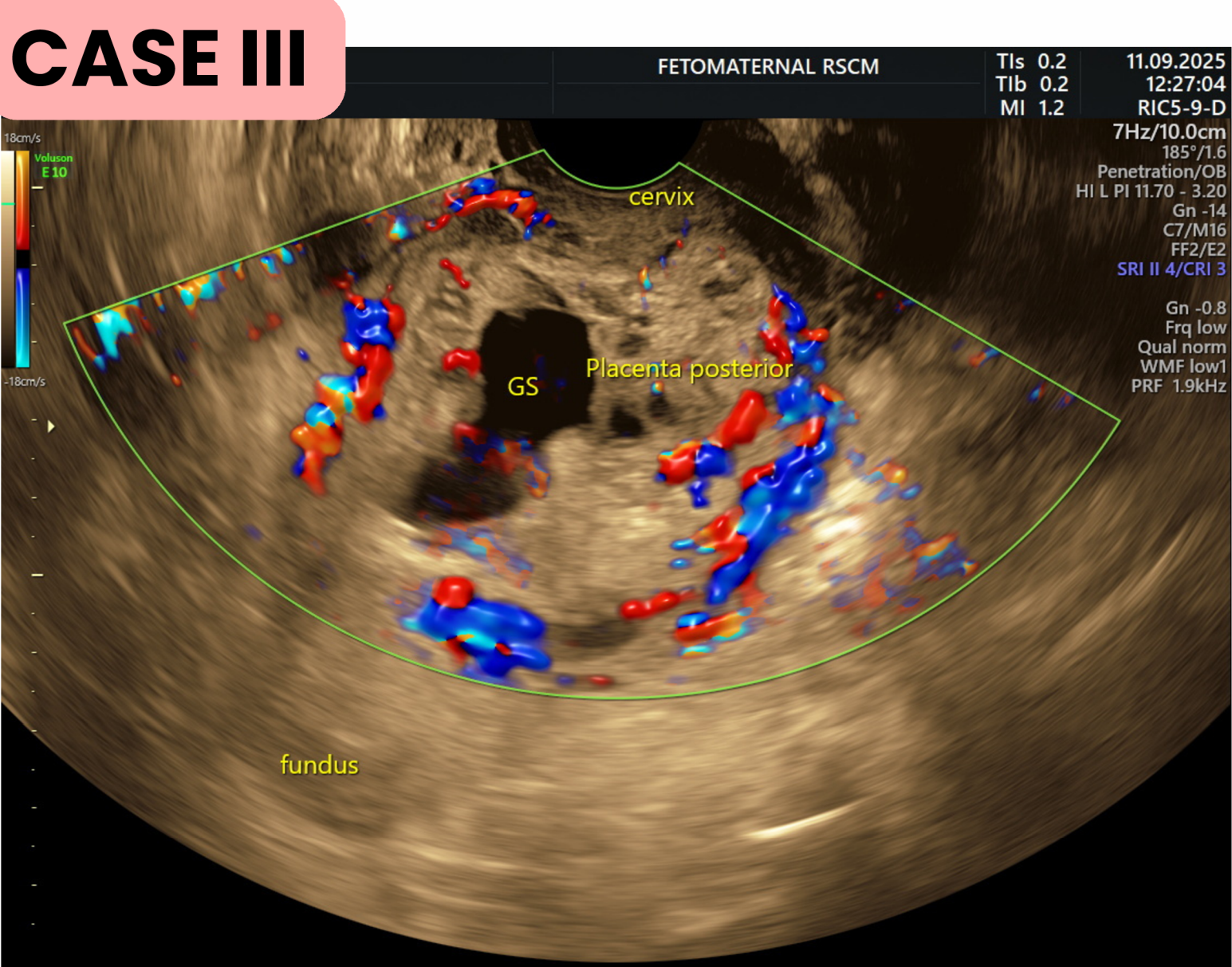
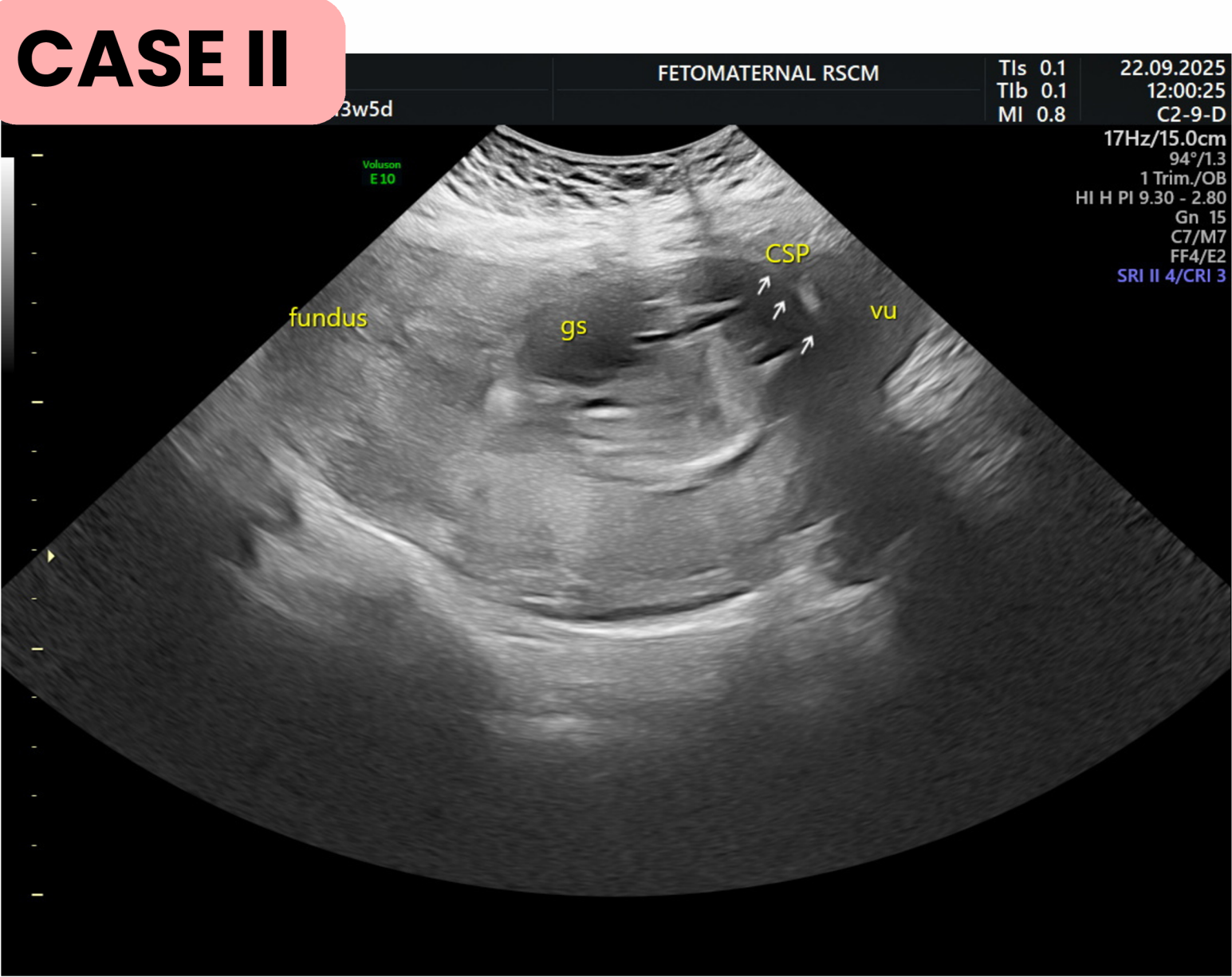
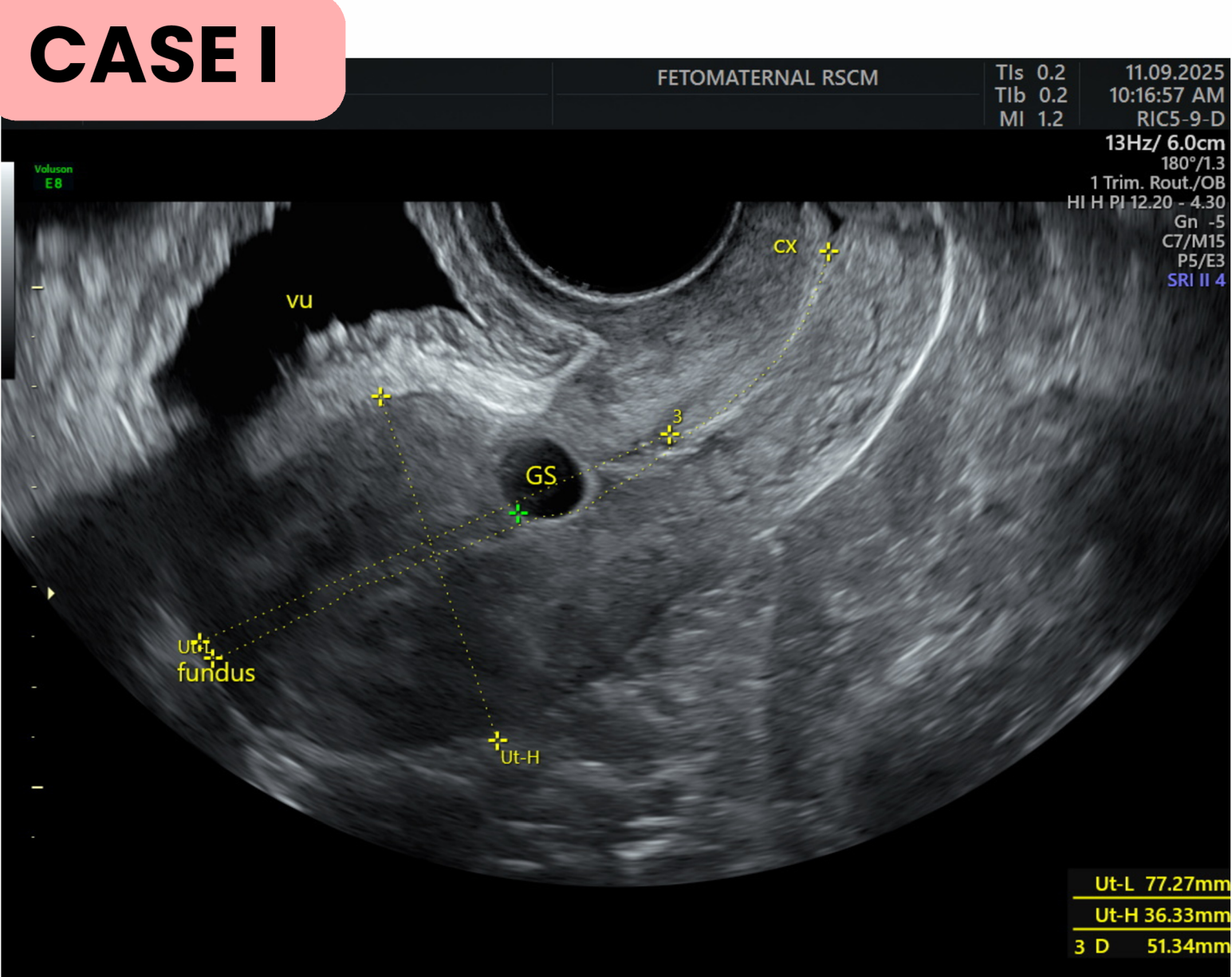


Introduction

- Caesarean scar pregnancy (CSP) is implantation of a gestational sac within the myometrial defect of a previous caesarean section.
- CSP is associated with placenta accreta spectrum (PAS), uterine rupture, and severe hemorrhage.
- Early and accurate transvaginal ultrasound diagnosis is essential to reduce maternal morbidity and preserve fertility.**

	Case 1	Case 2	Case 3
Parity & History of CS	36 y.o., G4P3, 1 previous LSCS	36 y.o., G6P5, 5 previous LSCS	34 y.o., G3P2, 1 previous LSCS
Gestational age	5w5d	13w3d	13w3d
Fetal heart beat	Negative	Positive	Negative
Initial B-hCG	NA	NA	8.023 mIU/mL
Residual myometrial thickness (RMT)	1.2 mm	0.9 mm	0.9 mm
Vascularity	Decreased, post MTX 1 dose	Intense	Intense, post MTX (3 doses)
Exogenic/Endogenic Vial et al. (2000)	Exogenic	Exogenic	Endogenic
Crossover Sign (COS) Cali et al. (2017)	COS-1	COS-1	COS-2+
Grade I/II/III/IV JC Shih et al. (2018)	Grade II	Grade III	Grade III
Ia/Ib/IIa/IIb/IIIa/IIIB Zhang et al. (2024)	IIb	IIIB	IIIB
Management	MTX & suction curettage	Focal resection and bilateral salpingectomy	MTX (day 1, 3, 5), suction curettage, convert to total hysterectomy with bilateral hypogastric artery ligation

USG Findings

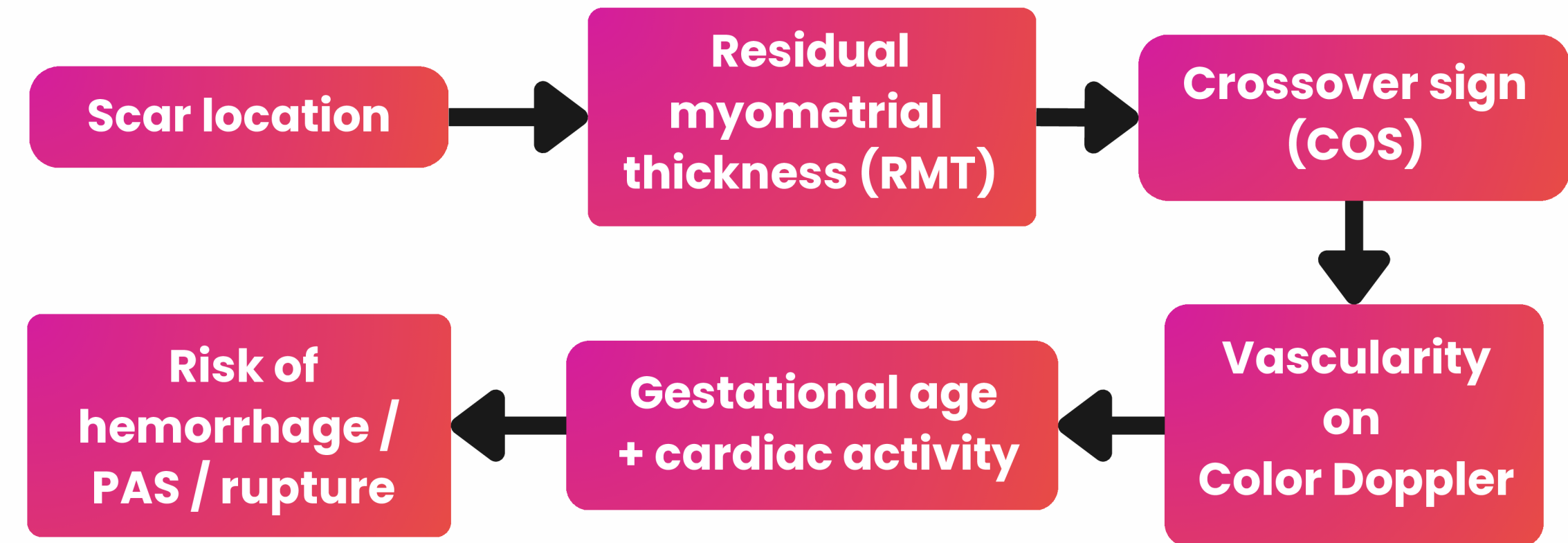


Discussion

Diagnostic Features of CSP

- Empty uterine cavity**
 - No gestational sac within the endometrial cavity.
- Empty cervical canal**
 - Helps distinguish CSP from cervical ectopic pregnancy.
- Gestational sac at the previous cesarean scar**
 - Located in the lower anterior uterine segment, at the site of the previous hysterotomy.
- Markedly thin/absent myometrium**
 - Myometrial layer between the gestational sac and bladder is markedly thinned (<5 mm).
- Prominent peritrophoblastic vascularity**
 - Color Doppler demonstrates increased vascularity surrounding the implantation site.
 - Particularly important for predicting hemorrhagic risk.

Standardized Sonographic Assessment



Conclusion

- This case series highlights the heterogeneity of caesarean scar pregnancy and demonstrates the value of systematic ultrasound-based risk stratification beyond diagnosis alone.
- Residual myometrial thickness, vascularity, growth pattern/COS, gestational age, and fetal cardiac activity were key sonographic features for estimating hemorrhagic risk and guiding individualized treatment.
- Earlier and lower-risk presentations may be managed with conservative image-guided approaches, whereas advanced or high-risk CSP requires more aggressive surgical planning. Tailoring management to sonographic risk may reduce severe hemorrhage while maximizing the opportunity for fertility preservation.

Ultrasound Risk Stratification

Sonographic parameter	Lower risk	Higher risk
RMT	≥3 mm	<3 mm
Vascularity	Low/moderate	Rich/intense
Growth pattern	Endogenic	Exogenic / bulging toward bladder
Cardiac activity	Absent	Present
Gestational age	Early	≥9 weeks
Bladder interface	Preserved	Marked thinning / suspected invasion

CSP should be distinguished from:

- Cervical ectopic pregnancy
- Miscarriage in progress
- Low implanted intrauterine pregnancy
- Placenta accreta spectrum in an ongoing intrauterine pregnancy

Is MRI needed?

- MRI may provide additional information about myometrial and bladder invasion.
- Reserve MRI for equivocal or atypical ultrasound findings.

Management

Management is **individualized based on gestational age, cardiac activity, RMT, vascularity, and fertility goals.**

- Early, low-risk CSP** → MTX ± ultrasound-guided suction evacuation.
- High-risk CSP** → Combined medical, image-guided, or surgical treatment.
- Advanced CSP / suspected PAS** → Surgical resection or hysterectomy.
- Uncontrolled hemorrhage** → Emergency surgery, including hysterectomy when necessary.

References

