Cesarean Scar Ectopic Pregnancy

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Maternal-Fetal Medicine

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- I have no financial disclosures
- Any included patient cases have been de-identified

Objectives

- Define cesarean scar ectopic pregnancy (CSEP)
- Review risk factors and epidemiology of CSEP
- Discuss morbidity/mortality associated with CSEP
- Learn about ultrasound findings that are suggestive or diagnostic of CSEP
- Briefly review management strategies and outcomes data

- Early pregnancy implants into a cesarean section scar
- Form of ectopic pregnancy

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How commonly do they occur?

- Estimated at 1 in 2000 pregnancies
  - Make up 6.1% of ectopic pregnancies in patients with prior cesarean section
- The actual rate is unknown as many cases go undiagnosed and/or unreported
- Incidence seems to be increasing
  - Higher rates of CS
  - More awareness of the diagnosis

Jurkovic et al
Seow et al

- Pathogenesis is not completely understood
- It is thought that the blastocyst my implant within a microscopic area of dehiscence in the cesarean scar.
- As the pregnancy grows, the fibrous scar tissue is at risk of further dehiscence as well as placenta accreta spectrum (PAS) and rupture.

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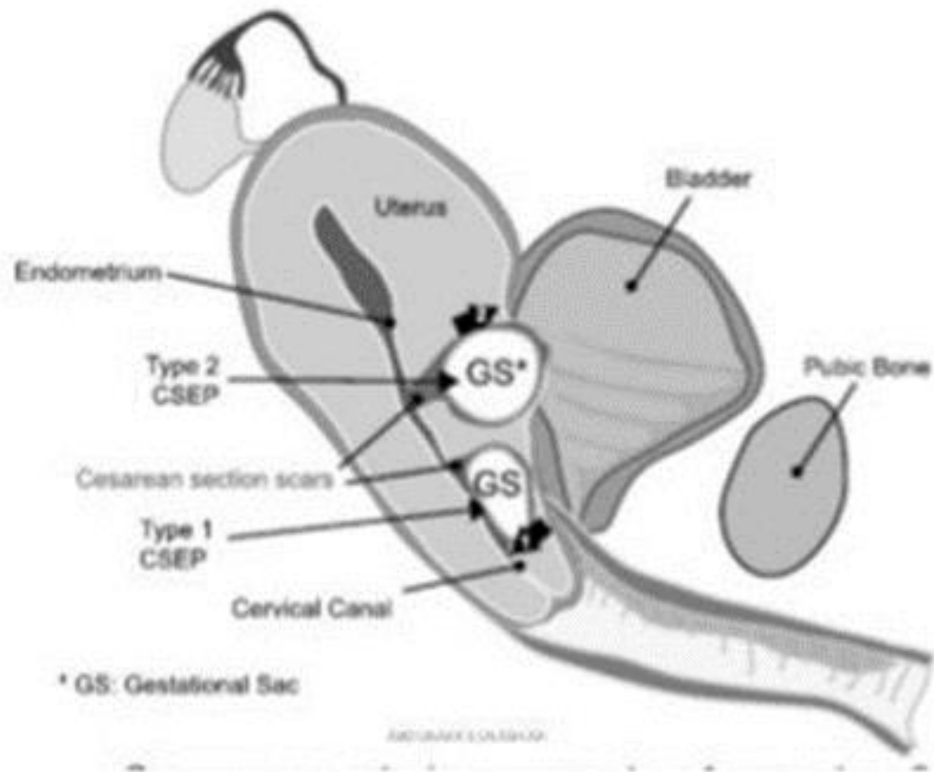
- 52% of CSEP cases occur in people with a single prior cesarean delivery
  - Unclear if multiple prior CD increase the risk further
- Malpresentation as the indication for prior cesarean associated with increased risk

Riaz et al
McKenna et al

- Likely follow similar physiologic processes and are the spectrum of one disease
- Histopathologically speaking, they have been demonstrated to be indistinguishable
  - Myometrial or scar tissue villous invasion with no/little decidua

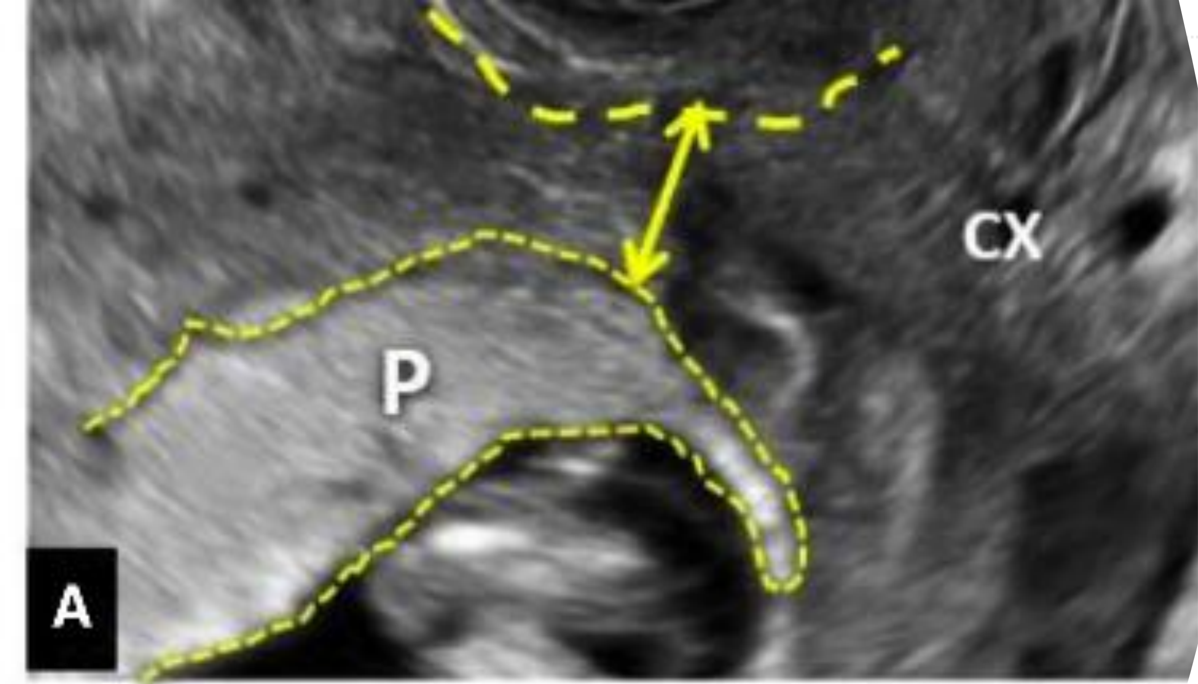
Timor-Tritsch et al

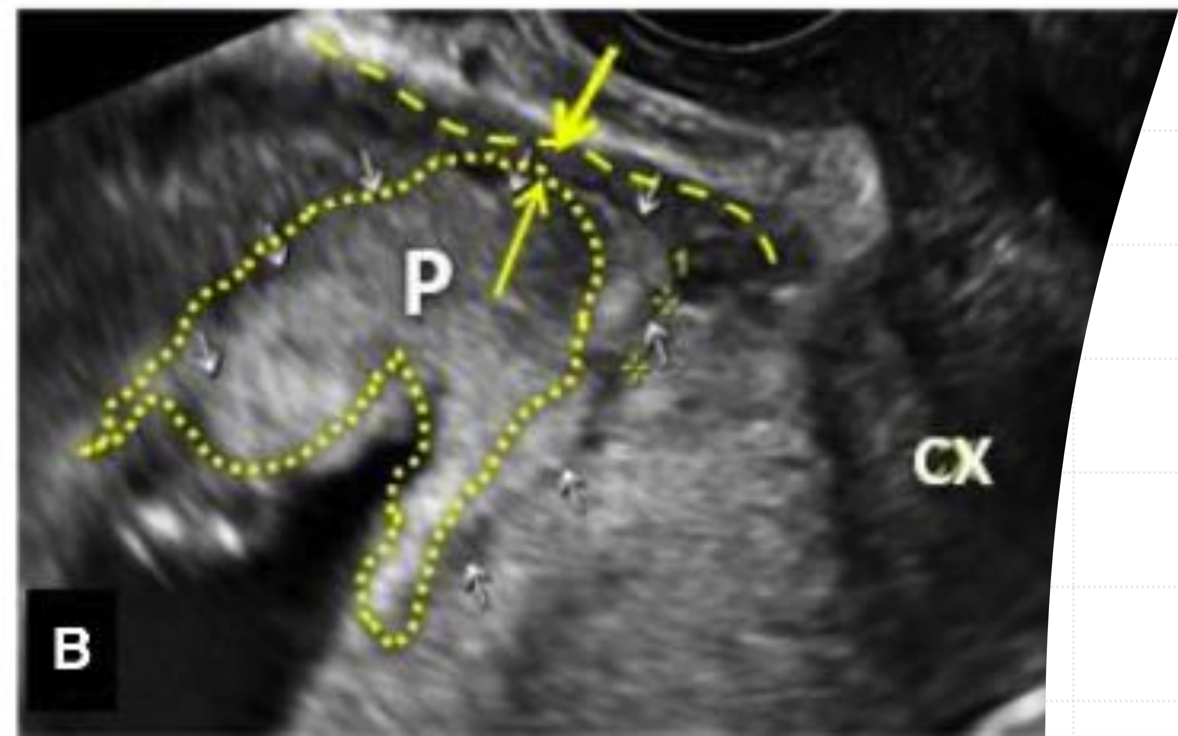


Shen et al, 2014

Types of CSEP

- Type 1-Endogenic or “on the scar”
  - Grow within the cavity
- Type 2-Exogenic or “in the niche”
  - Grow deep in the scar toward the bladder/abdominal cavity

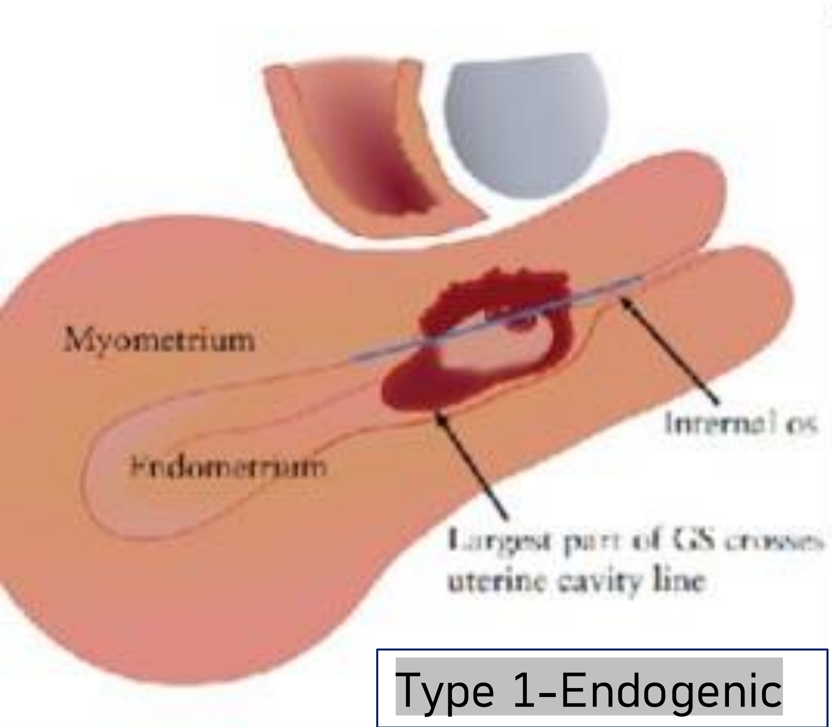




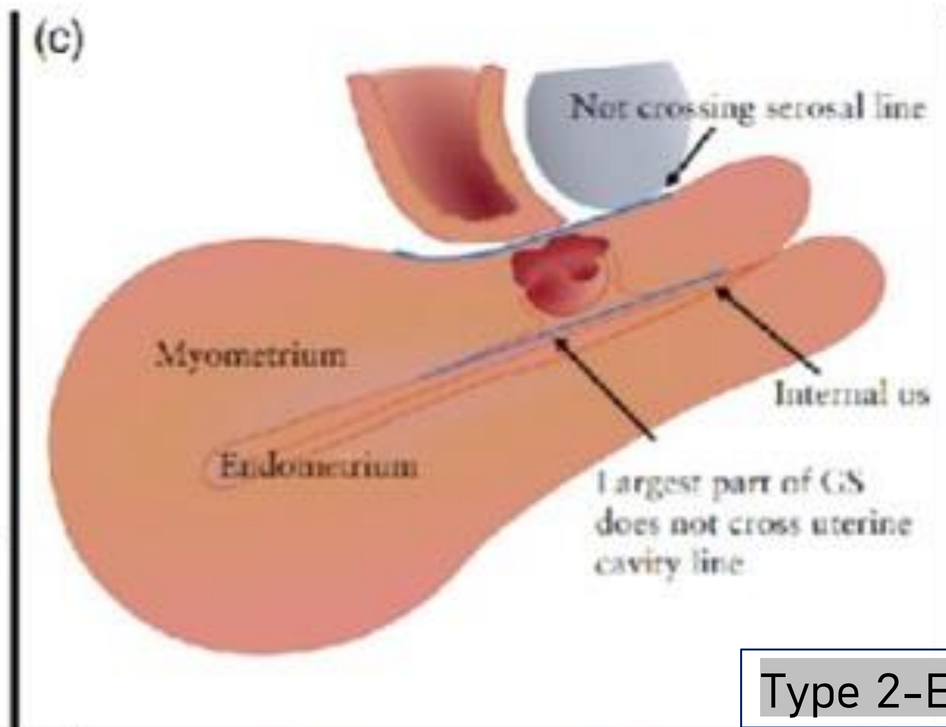
Types of CSEP

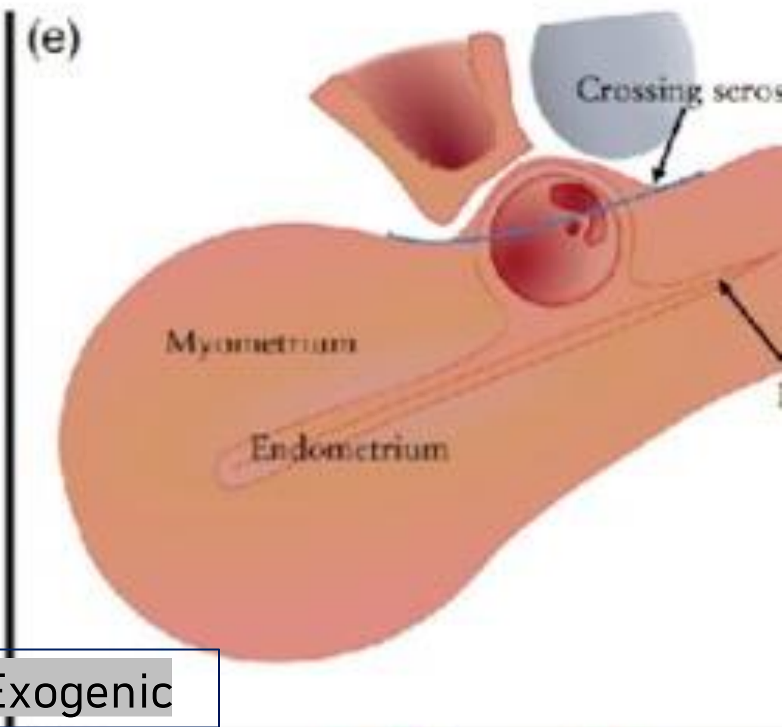
- Type 1-Endogenic or “on the scar”
- Type 2-Exogenic or “in the niche”
  - Exogenic appears to have higher morbidity/mortality risk than endogenic

Kaelin et al

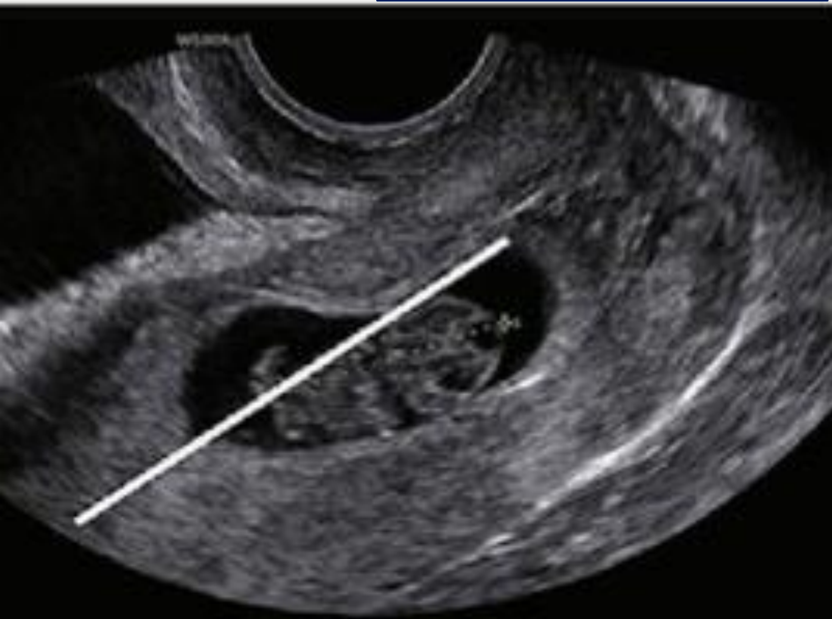


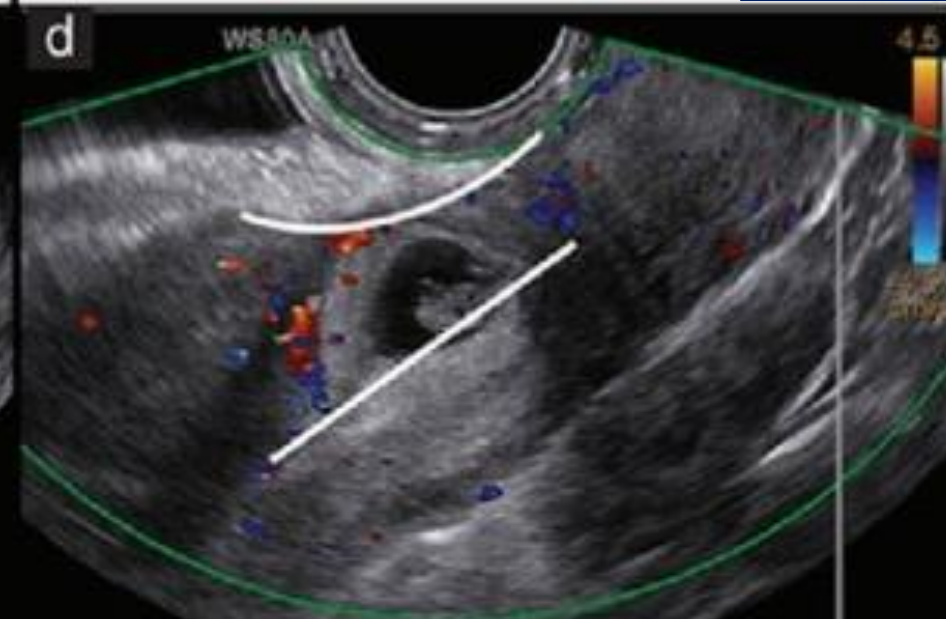
Type 1-Endogenic

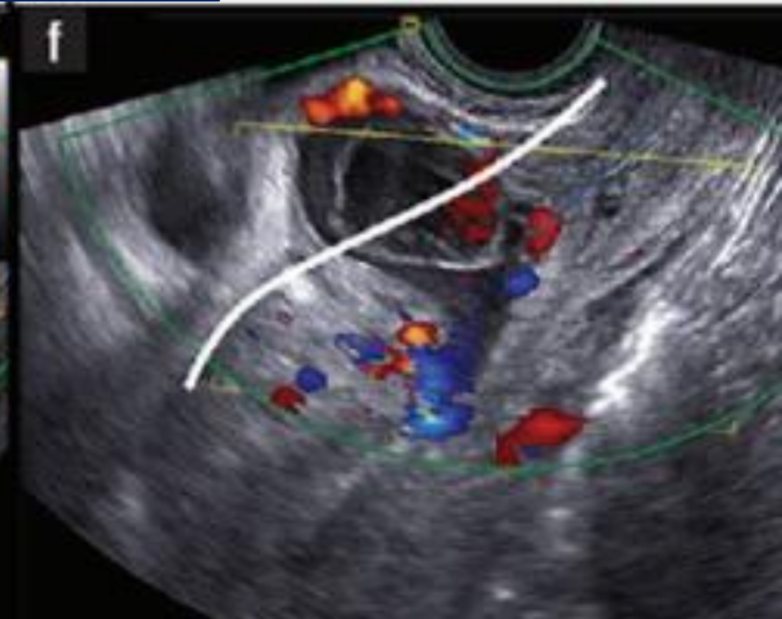




Type 2-Exogenic







- Risk of hemorrhage
- Placenta accreta spectrum (PAS)
- Uterine rupture
- Morbidity and mortality risk is tied to timing of diagnosis and early diagnosis can often be difficult

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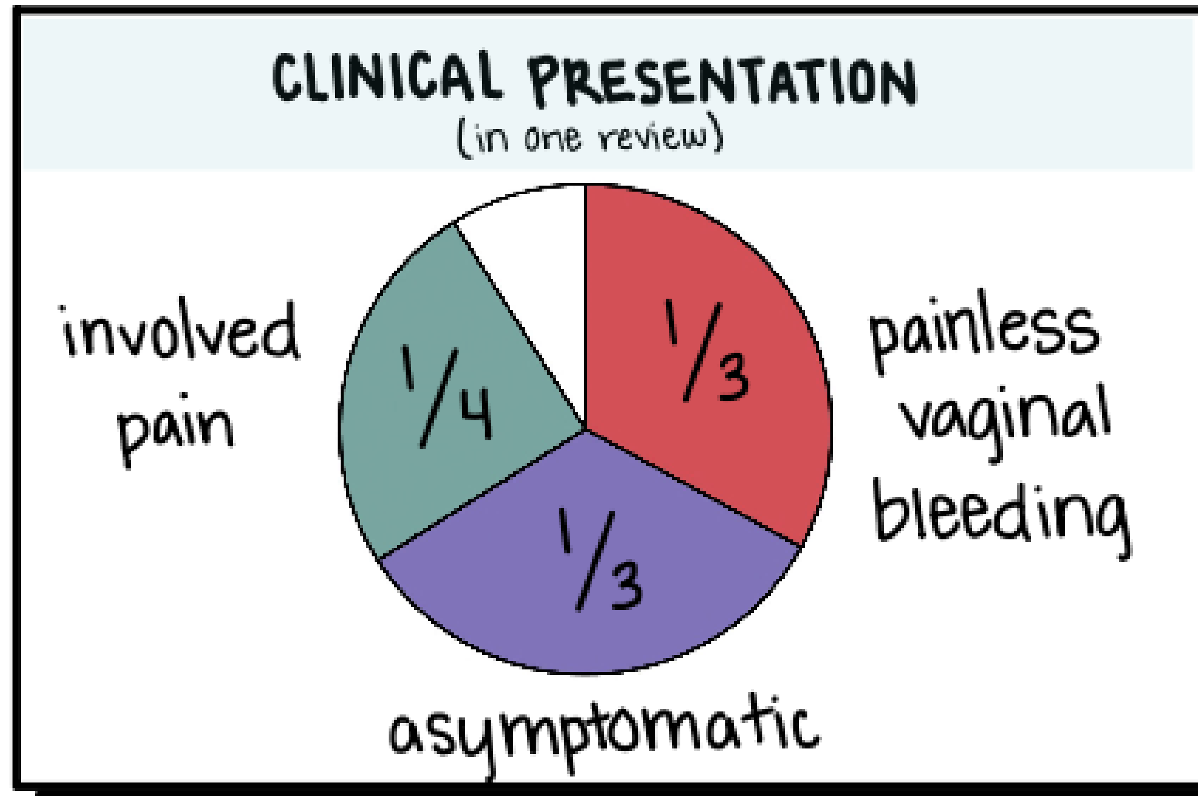
What leads to diagnosis?



- If ruptured, may present with hemodynamic instability/collapse

Rotas et al, SMFM visual reference

- Ultrasound remains the primary imaging modality for diagnosis of CSEP
- Prompt and accurate diagnosis remains difficult
- Average gestational age at diagnosis 7.5w +/- 2.5w
- MRI might be helpful but data are not clear on this-may be most useful to determine if there is advanced involvement of bladder or other extrauterine organs

Rotas et al

- Spontaneous abortions in progress
- Intrauterine pregnancies low in the uterus
- Cervical ectopic pregnancy.

- If you see a gestational sac low in the uterus, it should raise suspicion for CSEP
  - Always be on the look out!
- Endovaginal ultrasound is essential
- Use color Doppler flow
- Obtain image including both the uterine fundus and the pregnancy when possible
- 3D imaging might be useful but limited data to support benefit/utility

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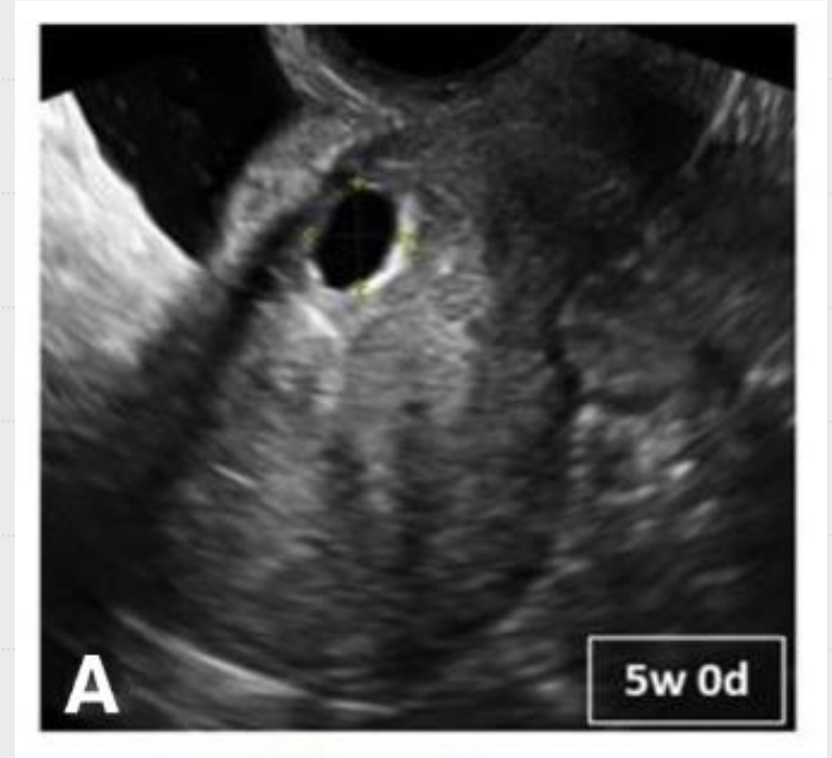
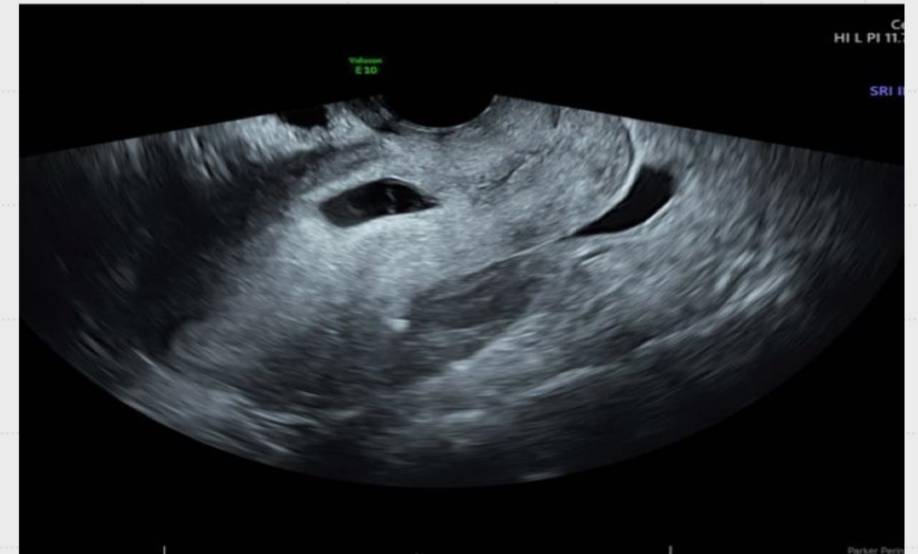
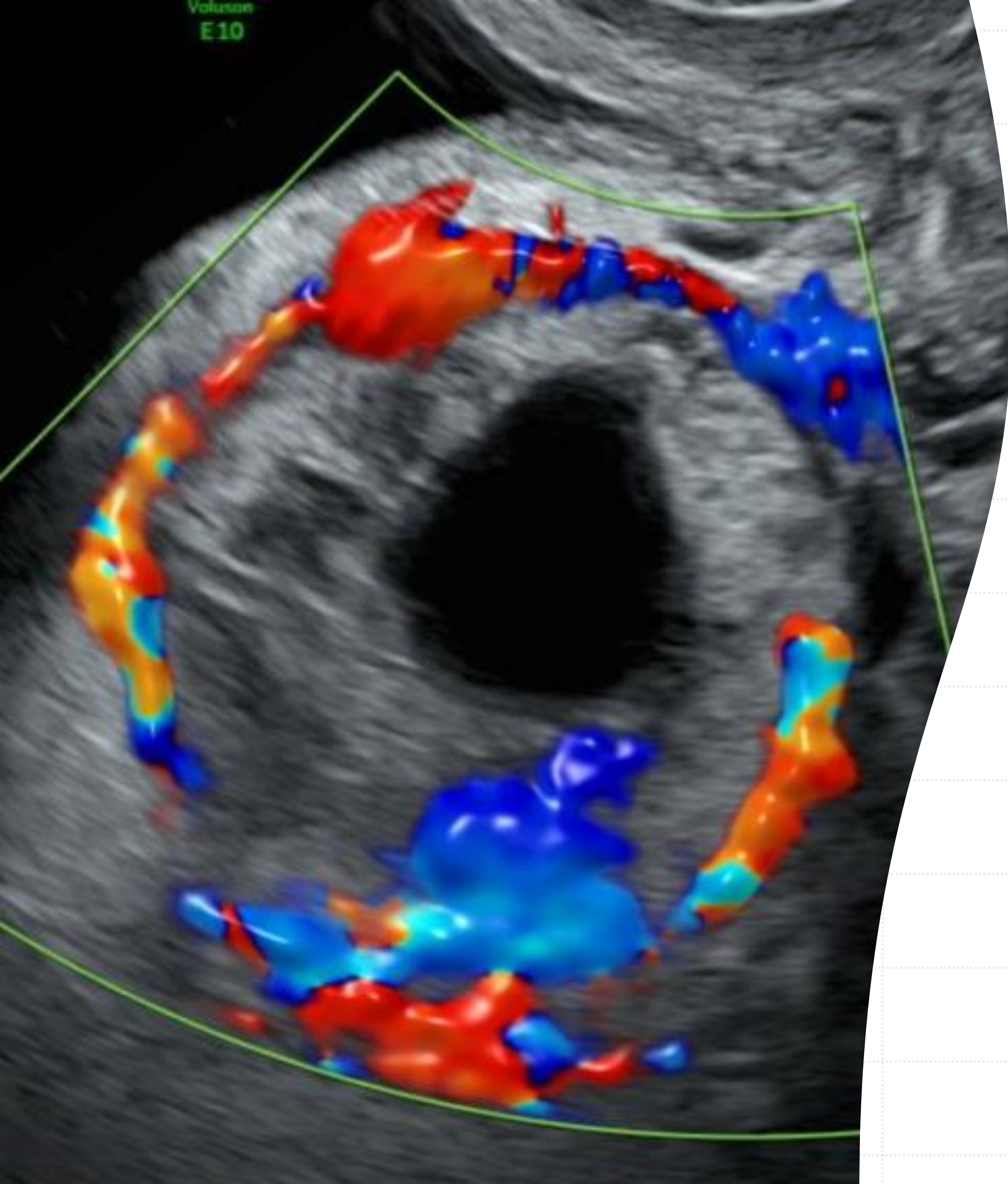
- Empty uterine cavity and endocervix
- Placenta and/or gestational sac embedded onto/into the hysterotomy scar
- Triangular (<8w) or rounded (>8w) gestational sac filling the scar
- Thin (<3mm) or absent myometrial layer between gestational sac and bladder
- Prominent vascular pattern at area of the prior scar
- Embryo, fetus, yolk sac
- *Not all criteria will be seen with each case*

Timor-Tritsch et al
Moschos et al

Empty uterine cavity and endocervical canal

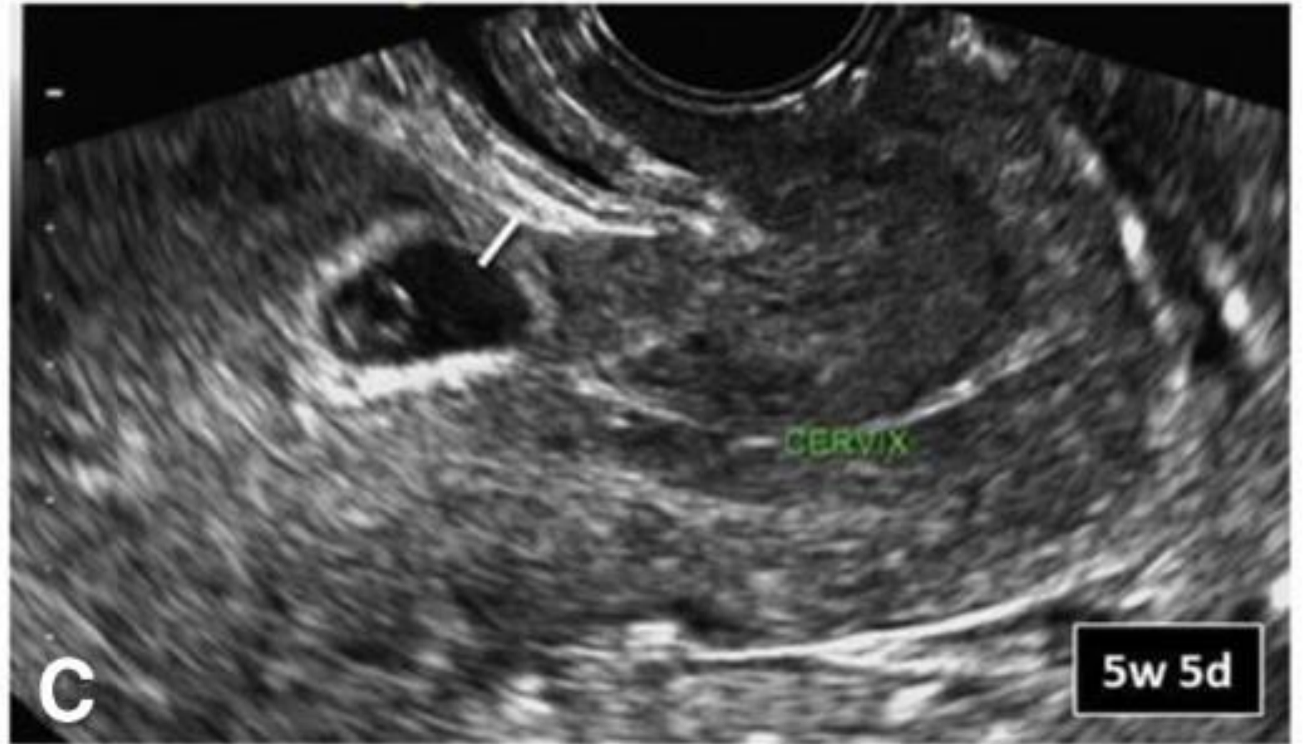




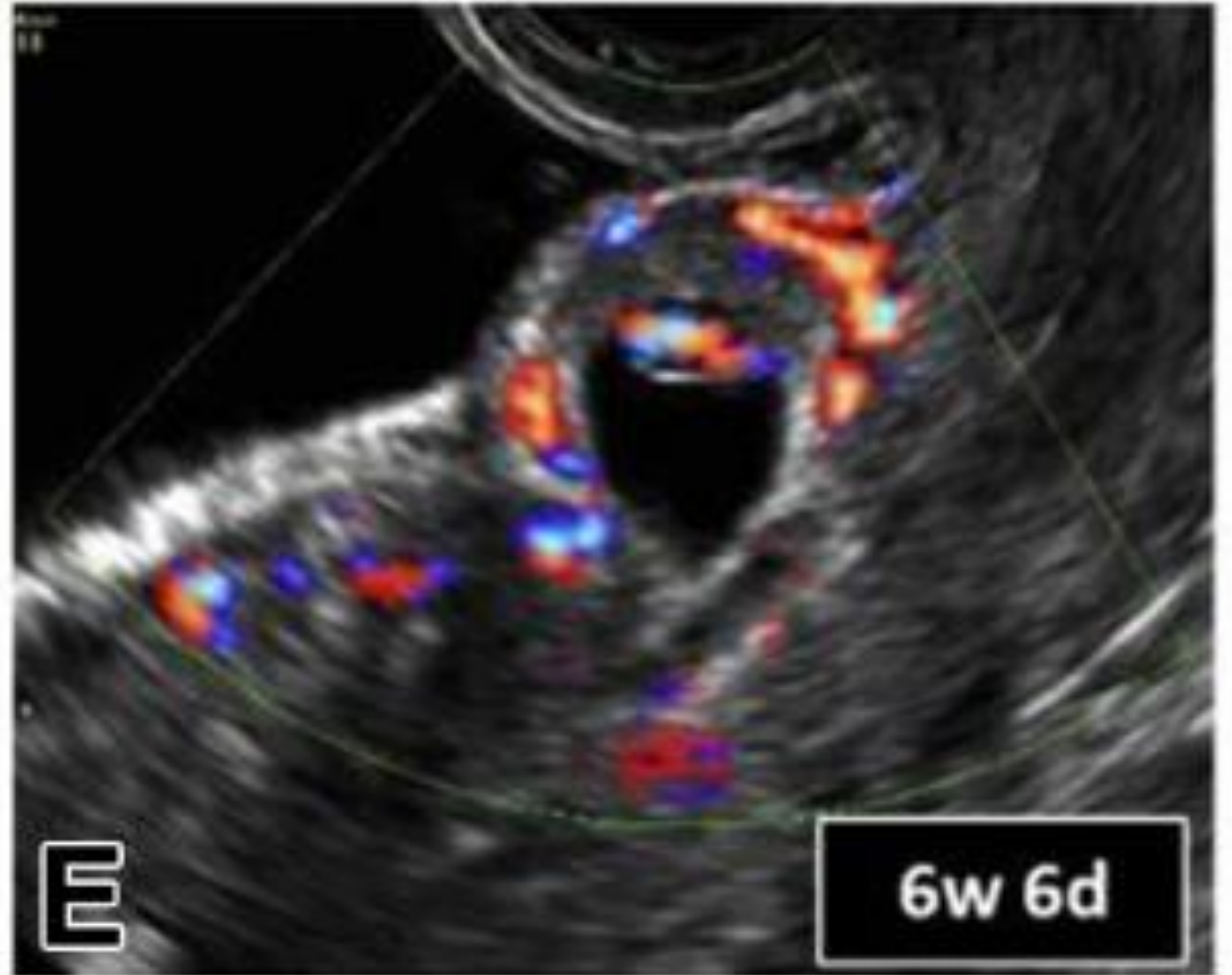


Vascularity

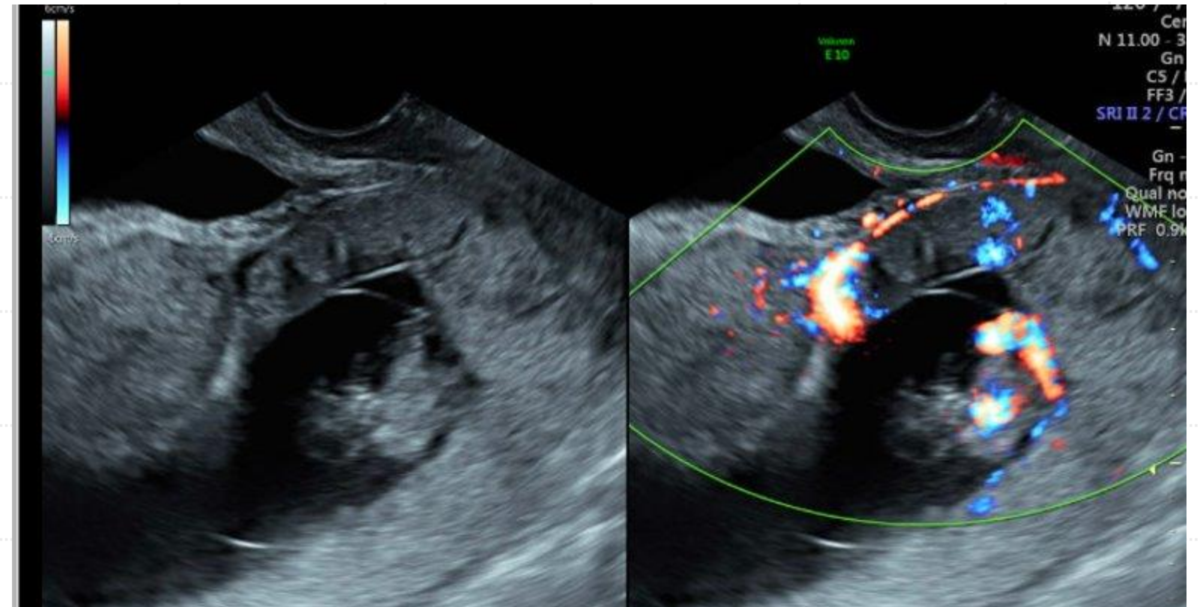
Thin Myometrium

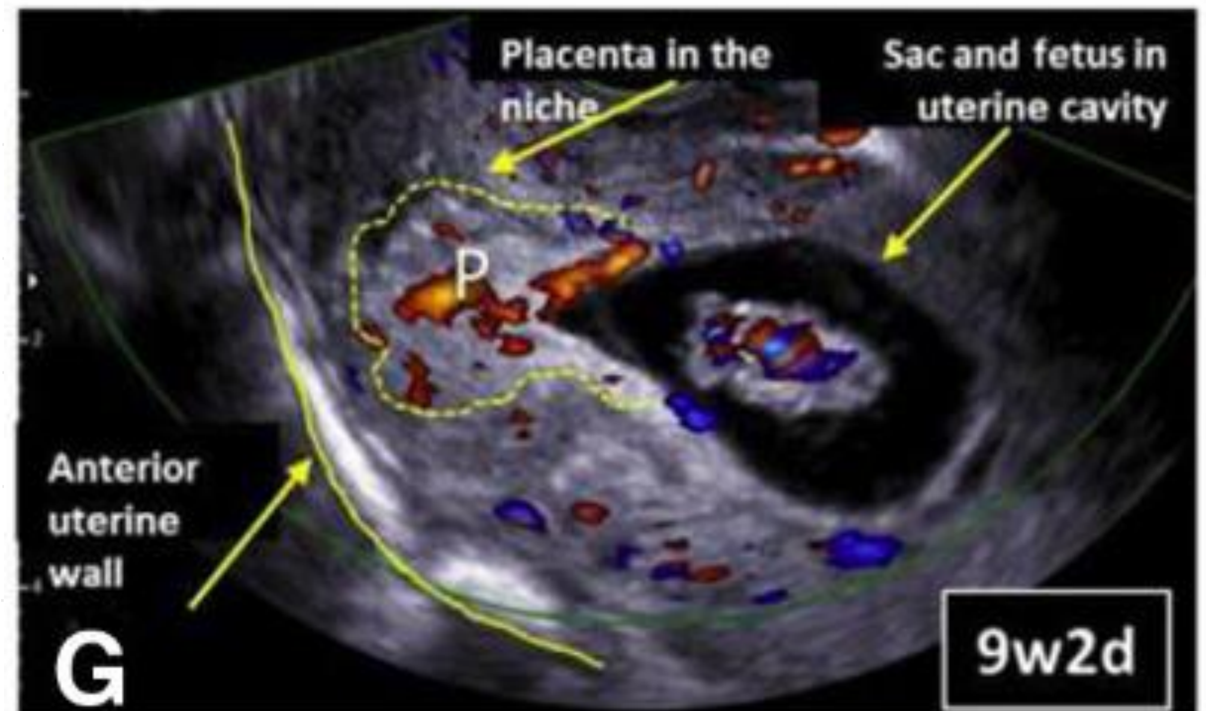


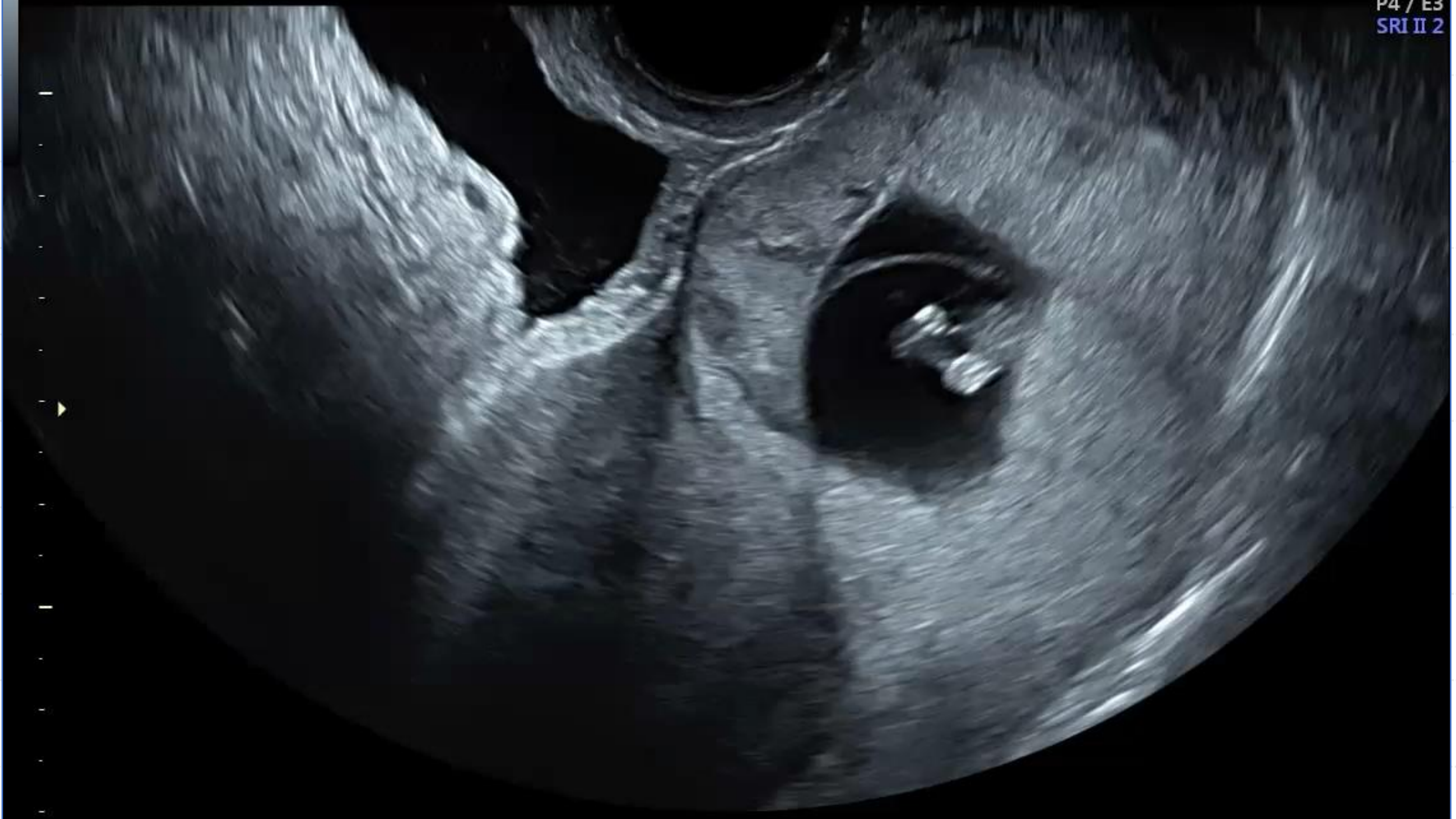
Bulging into the bladder



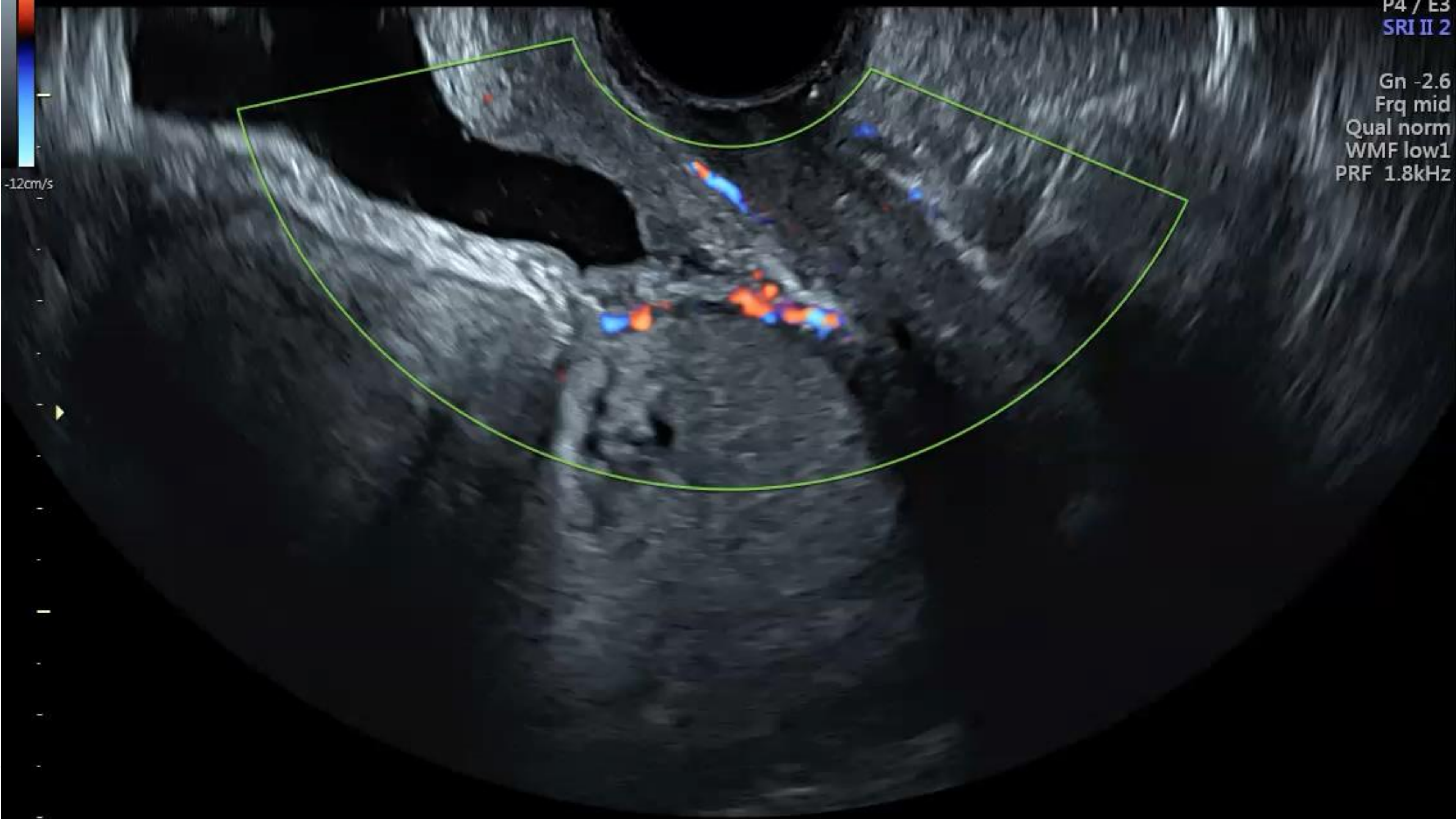
Progression over time



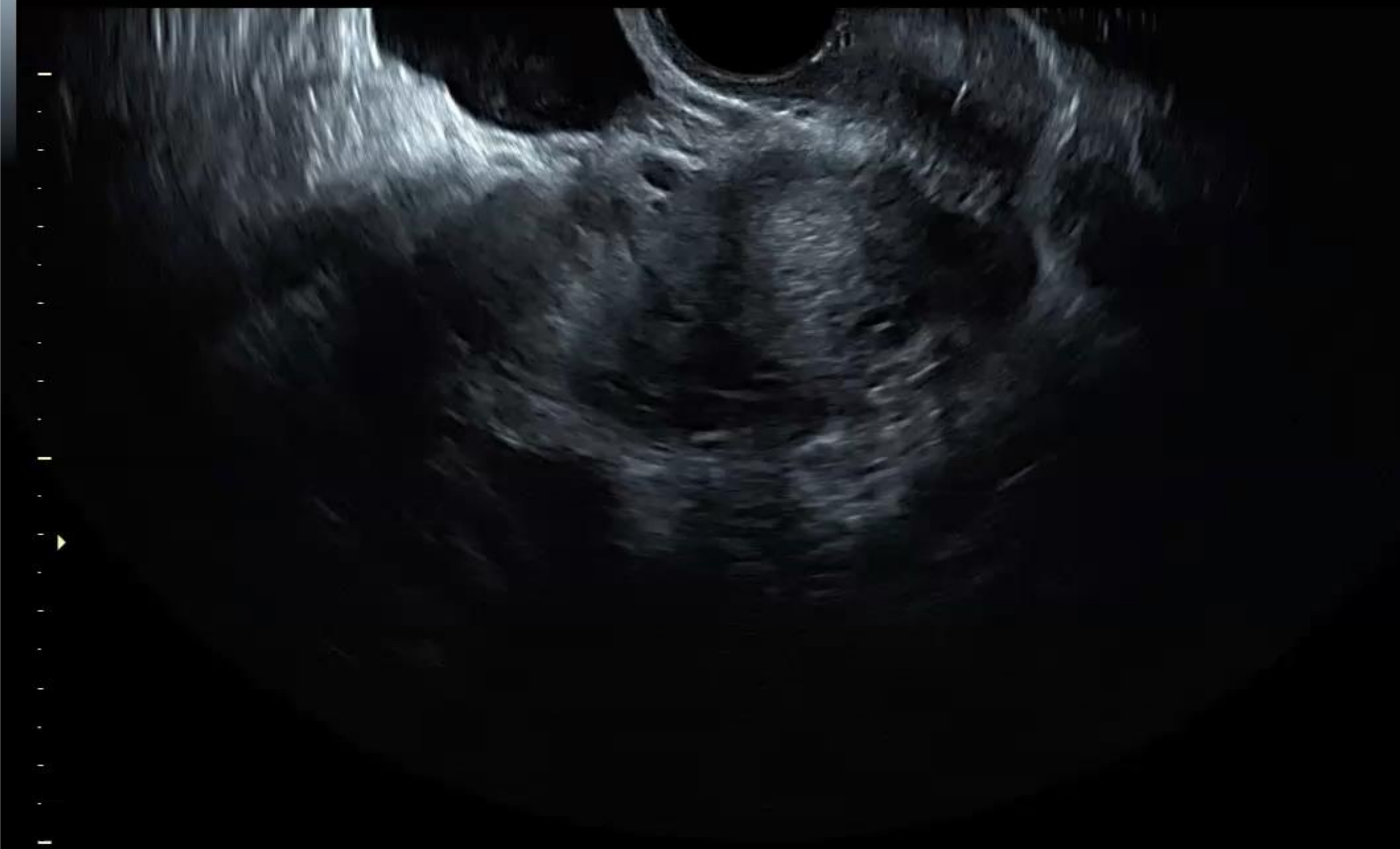




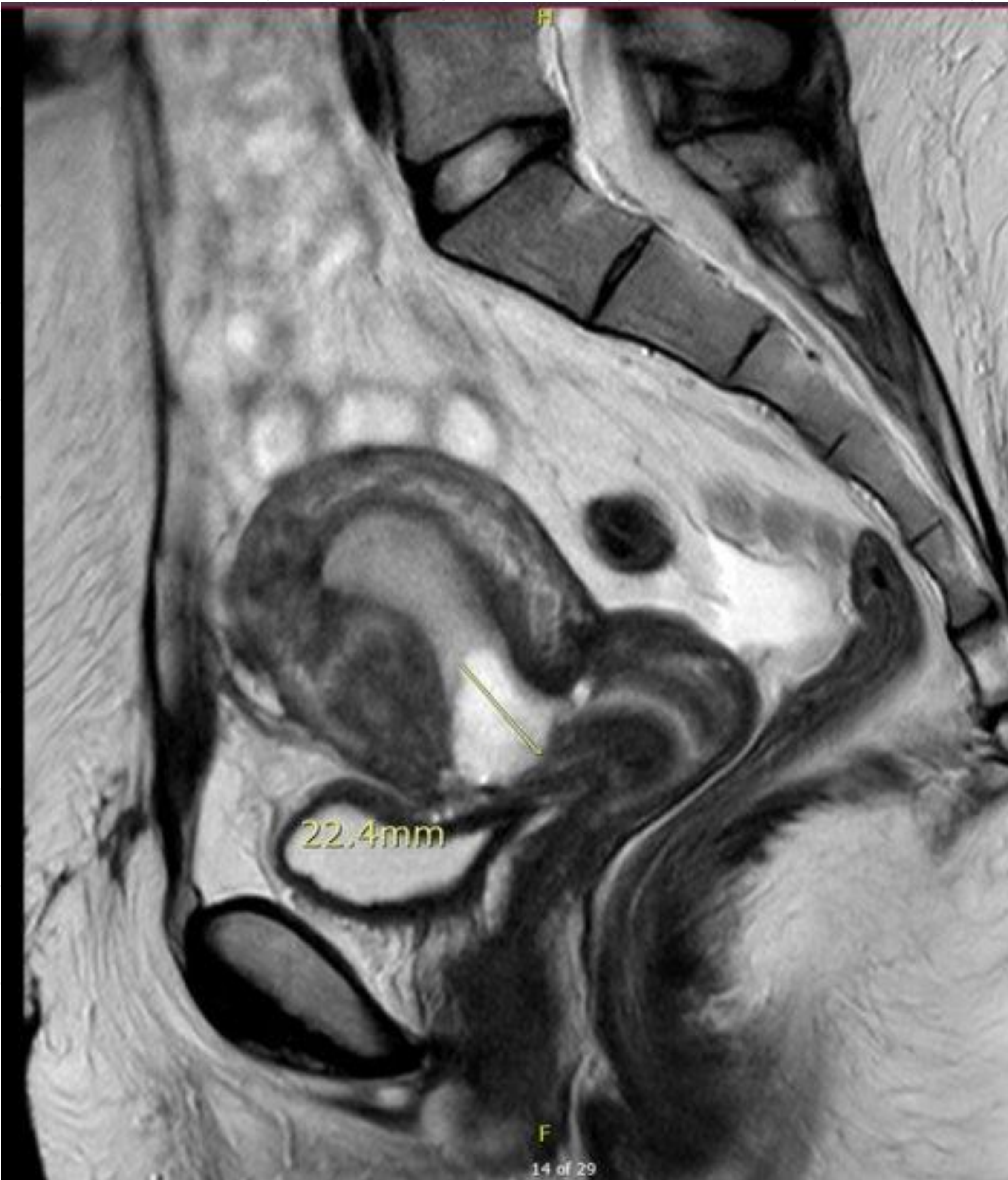
TIs 0.3
TIb 0.3
MI 1.1
RIC5-9-D
GYN
7.0cm / 1.3
180°/ 21Hz
Cervix
HH PI 13.20 - 4.90
Gn 3
C7 / M5
P4 / E3
SRI II 2
Voluson
E10



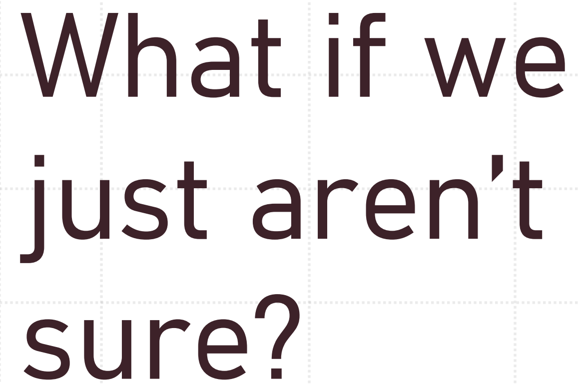
TIs 0.2
TIb 0.2
MI 1.0
RIC5-9-D
GYN
7.0cm / 1.3
180°/ 12Hz
Cervix
HH PI 13.20 - 4.90
Gn 3
C7 / M5
P4 / E3
SRI II 2
Gn -2.6
Frq mid
Qual norm
WMF low1
PRF 1.8kHz
12cm/s
-12cm/s
Voluson
E10



TIs 0.3
TIb 0.3
MI 0.7
RIC5-9-D
GYN
10.0cm / 1.3
180°/ 17Hz
Cervix
HH PI 13.20 - 4.90
Gn 7
C7 / M5
P4 / E3
SRI II 2
Voluson
E10



MRI Example



What if we just aren’t sure?

- Seek an expert (Maternal-Fetal Medicine)
- Short interval follow up for reassessment
- Additional imaging, sometimes with MRI

So we diagnosed one, what now?

- Surgical, medical, and minimally invasive management strategies have been utilized
- Which is the best? We don't quite know
- Expectant management is NOT recommended
- If patients decline active management of CSEP, they should be counseled about severe morbidity/mortality risk

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- Can consider expectant management in some cases
- Often takes months to resolve
- Expectant management can be associated with development of AVMs (20% in one cohort)

Timor-Tritsch et al

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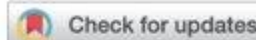

Society for Maternal-Fetal Medicine (SMFM); Russell Miller, MD; and Cynthia Gyamfi-Bannerman, MD; Publications Committee*

The American College of Obstetricians and Gynecologists (ACOG) and the Society of Family Planning endorse this document. The American Society for Reproductive Medicine supports this document.
This document replaces SMFM Consult Series #49: Cesarean scar pregnancy (May 2020).

UNNUMBERED TABLE 1
Summary of recommendations

	Recommendation	Grade
1	We recommend against expectant management of cesarean scar ectopic pregnancy.	1B
2	We suggest that operative resection (with transvaginal or laparoscopic approaches when possible) or ultrasound-guided uterine aspiration be considered for the surgical management of cesarean scar ectopic pregnancy and that sharp curettage alone be avoided.	2C
3	We suggest intragestational methotrexate for the medical treatment of cesarean scar ectopic pregnancy, with or without other treatment modalities.	2C
4	We recommend that systemic methotrexate alone not be used to treat cesarean scar ectopic pregnancy.	1C
5	In patients who choose expectant management and continuation of a cesarean scar ectopic pregnancy, we recommend repeated cesarean delivery between 34 0/7 and 35 6/7 wk of gestation.	1C
6	We recommend that patients with a cesarean scar ectopic pregnancy be advised of the risks of another pregnancy and counseled regarding effective contraceptive methods, including long-acting reversible contraception and permanent contraception.	1C

Society for Maternal-Fetal Medicine (SMFM). Consult Series #63: Cesarean scar ectopic pregnancy. Am J Obstet Gynecol 2022..

Management Options

- Surgical
  - Uterine aspiration
  - Hysteroscopy
  - Operative resection (transvaginal or laparoscopic)
  - Gravid hysterectomy
- Medical
  - Intragestational methotrexate
  - Other local injections
- Other
  - Double balloon catheter tamponade
  - High intensity focused ultrasound
  - Needle aspiration
  - Uterine artery embolization

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TABLE

Treatment options for cesarean scar ectopic pregnancy

Method	Number of studies		Number of patients	Efficacy, %[a]	Complications[b]
	Case series	RCTs			
Expectant management	5	0	41	41.5	53.7%
sMTX	18	3	339	75	13%
Needle aspiration+sMTX	6	0	148	84.5	15.5%
D&C	21	0	243	48	21%
Hysteroscopy[c]	7	0	95	83	3.2%
Transvaginal resection[d]	6	0	118	>99	0.9%
UAE+D&C	5	2	295	93.6	3.4%
UAE+D&C+hysteroscopy	1	1	87	95.4	1.2%
UAE+D&C+sMTX	13	1	427	68.6	2.8%
Local and sMTX	2	0	34	75	2.3%
Laparoscopy	7	0	69	97.1	0
Local MTX	2	1	74	64.9	4.1%
HIFU	1	0	16	100	0
HIFU+hysteroscopic suction curettage	1	0	52	100	0

Data adapted from Birch Petersen et al.[36]

D&C, dilation and curettage; *HIFU*, high-intensity focused ultrasound; *MTX*, methotrexate; *RCT*, randomized controlled trial; *sMTX*, systemic methotrexate; *UAE*, uterine artery embolization.

[a] Women who did not need additional treatment; [b] Severe complications such as hemorrhage and hysterectomy; [c] Eleven patients also had systemic MTX and hysteroscopy; [d] Twelve patients also had systemic MTX and transvaginal resection.

Society for Maternal-Fetal Medicine (SMFM). Consult Series #63: Cesarean scar ectopic pregnancy. Am J Obstet Gynecol 2022.

How to decide on the right option

- Patient counseling including desire for future fertility
- Efficacy and Risk based on type of CSEP
- Expertise and skill of medical providers
- Resources available for procedure and follow up

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In patients that decline management

- Recommend close surveillance with serial ultrasounds
- Recommend close monitoring for symptoms
- Recommend scheduled cesarean section between 34w0d and 35w6d
- Delivery in a center equipped to care for complex placenta accreta spectrum cases
- Multidisciplinary approach

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Risk in future pregnancies

- Increased risk of recurrent CSEP (rates are 5-40% depending on the study)
- Series of 7 patients who had pregnancies after CSEP
  - 4 intrauterine pregnancies-delivered by CS 35-36w
  - 2 pregnancies with PAS (one with triplets-intrauterine twins and a recurrent CSEP)
  - 1 with spontaneous uterine rupture with stillbirth and maternal death

- Recommend discussion about risk of future pregnancies
- Recommend reliable form of contraception

Naqi et al

- Data on best interval between pregnancies is lacking-maybe 12-24 months?
- Interpregnancy scar revisions-these have been described, data is lacking on benefit
- Some are doing interpregnancy uterine cavity assessment with saline infused sonography
- Early ultrasound in all future pregnancies with thorough assessment for recurrent CSEP and PAS
- Delivery by repeat CS at 34w0d-35w6d before the onset of labor
- Delivery in a center equipped to care for complex placenta accreta spectrum cases

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There are pregnancy registries as well

- https://csp- registry.com
- https://octri.ohsu.edu/redcap/surveys/? s1⁄4XCK7FLEA84

Take Home Points

- Always be on the look out!
- Early diagnosis is paramount
- If you aren't sure, refer!
- Treatment modalities depend on many factors
- Treatment both during the current pregnancy and future pregnancies should take place in a center with the capabilities to manage complex surgery and hemorrhage

References/resources

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