



The Bleeding Edge

Etiologies in the Late Preterm Period: Previa & Abruption Variations, Risk Factors & Presentation

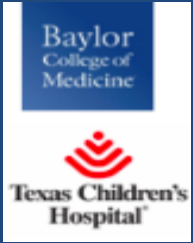
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Disclosures

Topic author &
reviewer for UpToDate

Learning objectives

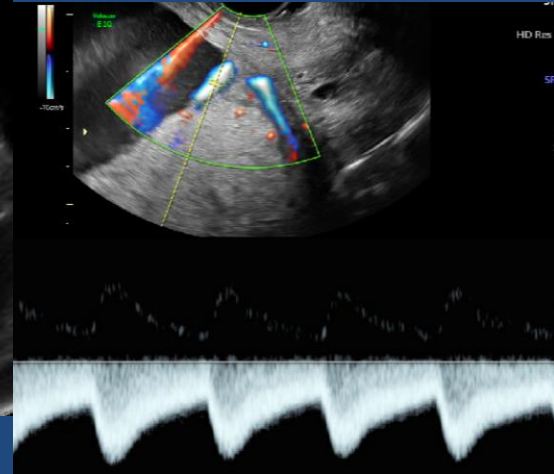
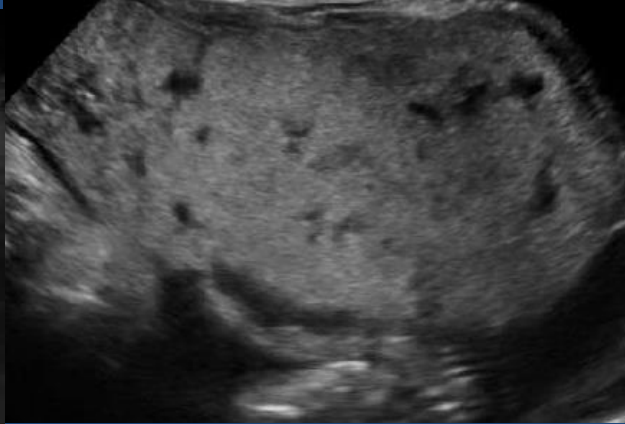
At the end of this presentation, participants should be able to

- ① Describe the etiologies of placental-related bleeding in late pregnancy
- ② Recognize the sonographic features of common placental abnormalities
- ③ Discuss common pitfalls in placental imaging

Bleeding in the Late Preterm Period

- 3rd trimester bleeding common complication
- Late preterm bleeding (34+0 – 36+6 weeks)
- Lower threshold for delivery at these GA
- Differing acuity

Bleeding in the Late Preterm Period

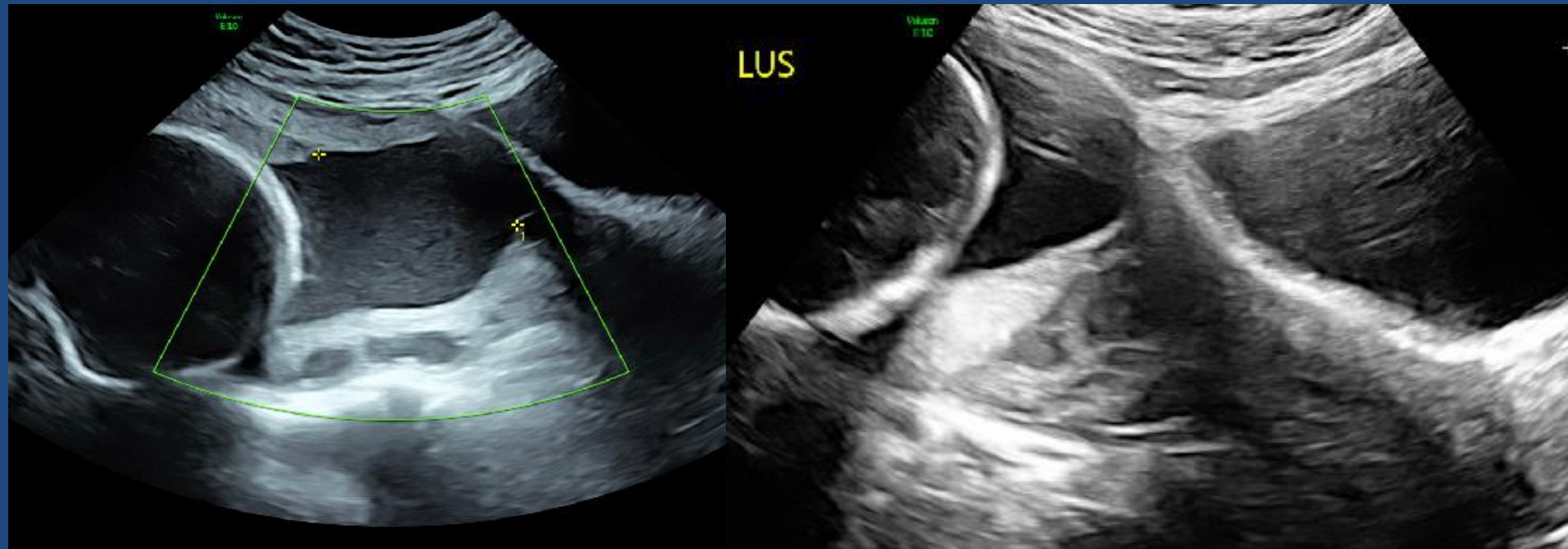


Placental location:

Lower placental margin

- Assess lower placental edge & its relationship to lower uterine segment & cervix in all 2nd & 3rd trimester US
- If lower placental edge is in lower uterine segment & suspected to be close to or covering cervix
 - TV sonography recommended
 - Diagnosis of placenta previa is best performed by TV approach

Placental Location



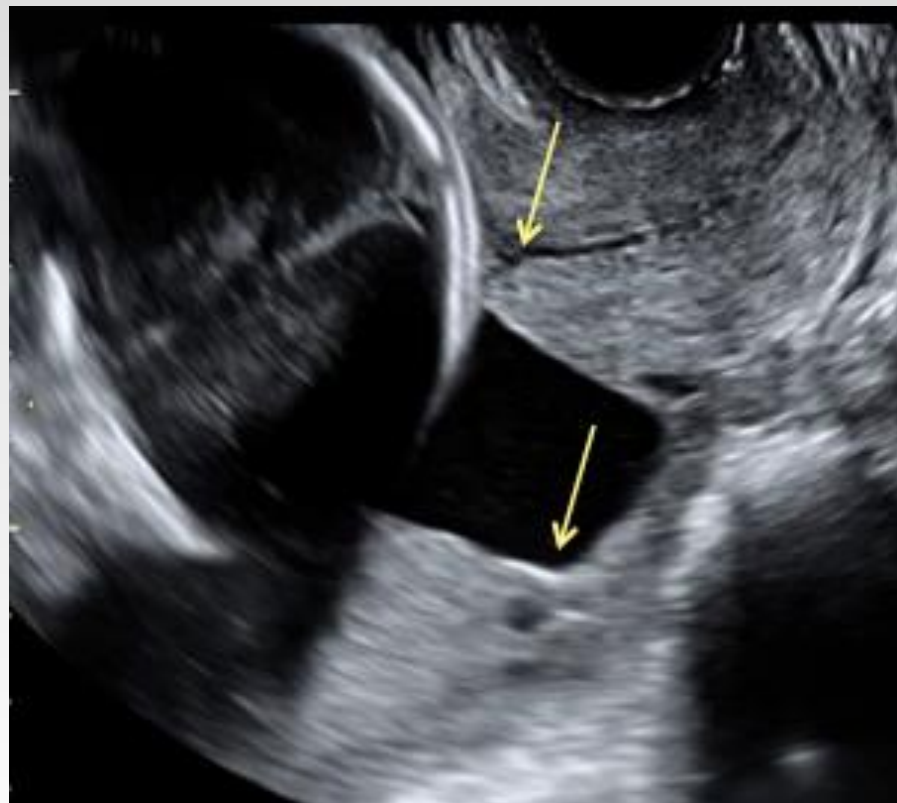
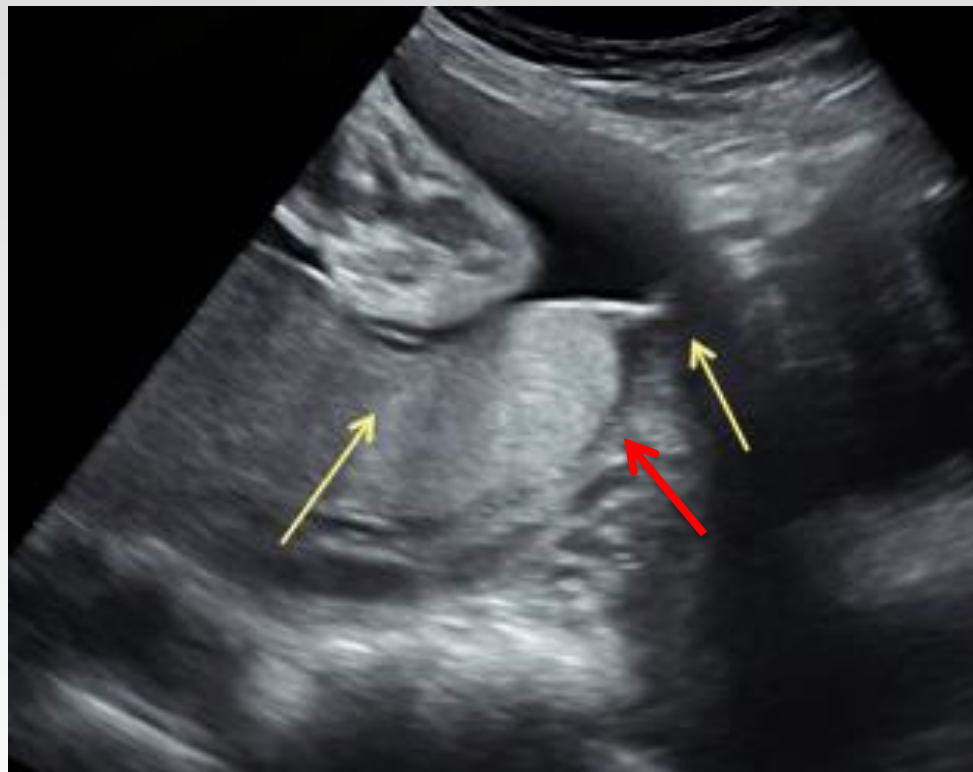
Bleeding in the Late Preterm Period: Obstetric Etiologies

- Placenta previa
- Placenta accreta spectrum
- Placental abruption
- Vasa previa
- Early labor

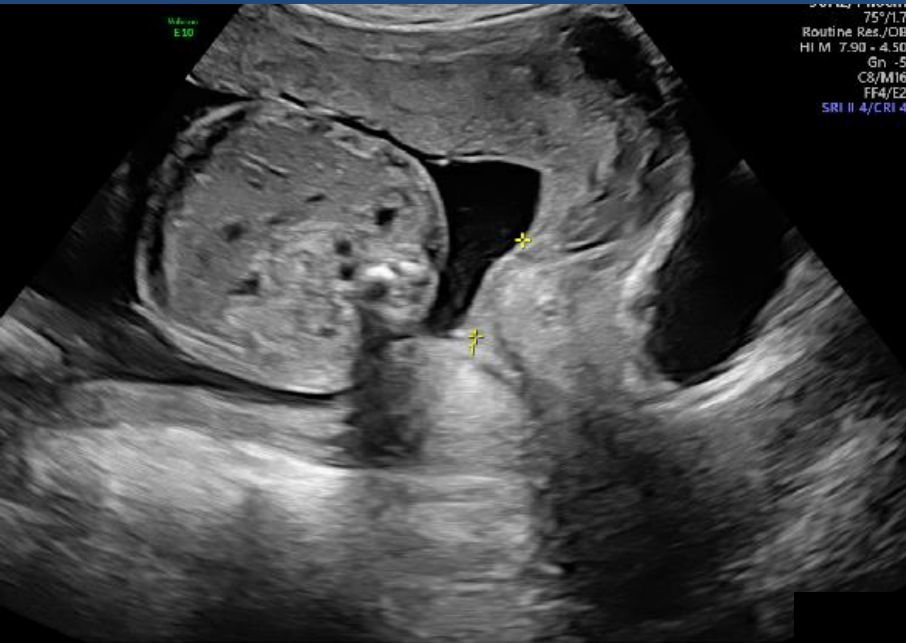
Placenta Previa

Placenta Previa: Terminology

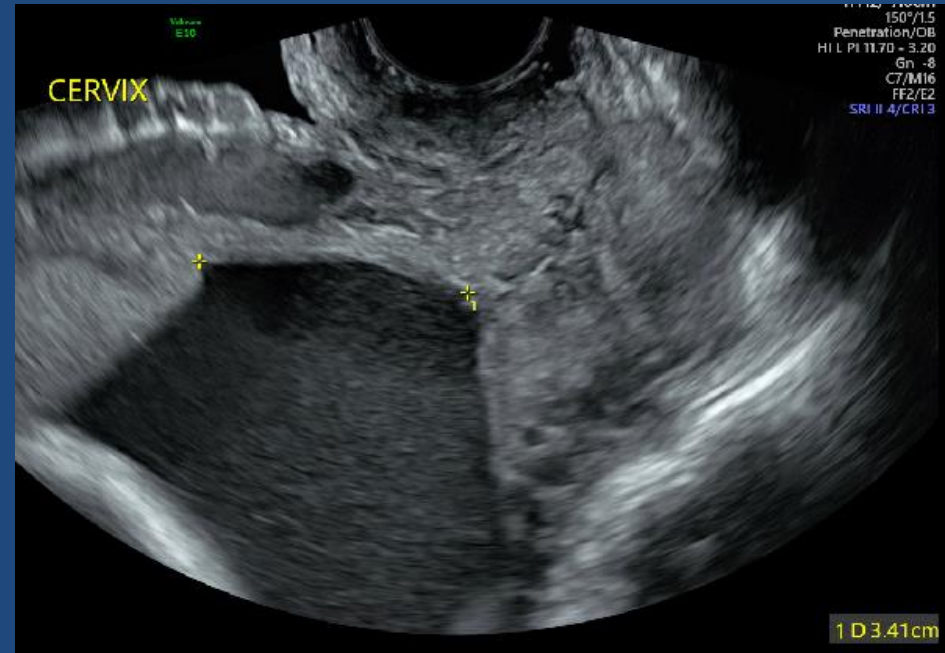
- Revised terminology => 3 categories
 - Placenta previa – placenta covers internal os
 - Low-lying placenta – placenta edge <2 cm from internal os
 - Normal placental edge >2 cm from internal os
- Terms “marginal” or “partial” placenta previa are no longer used



Transabdominal



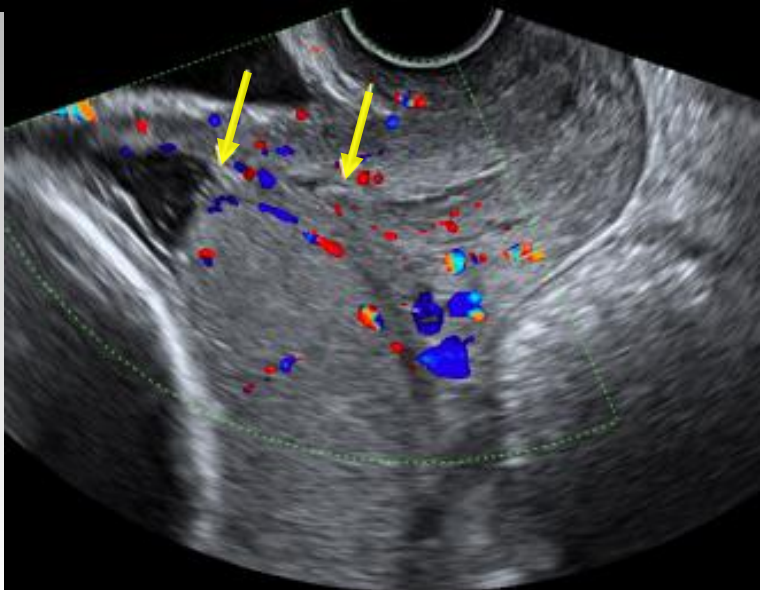
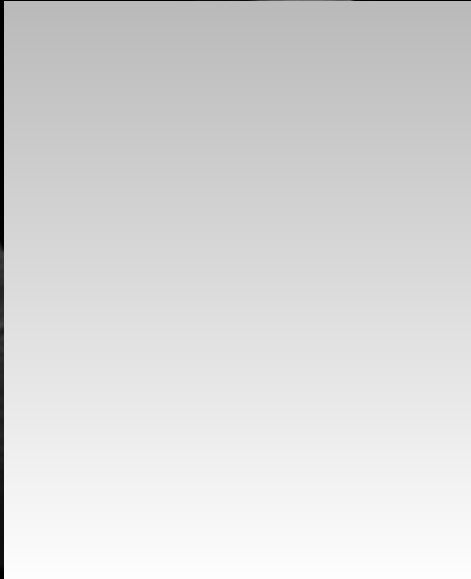
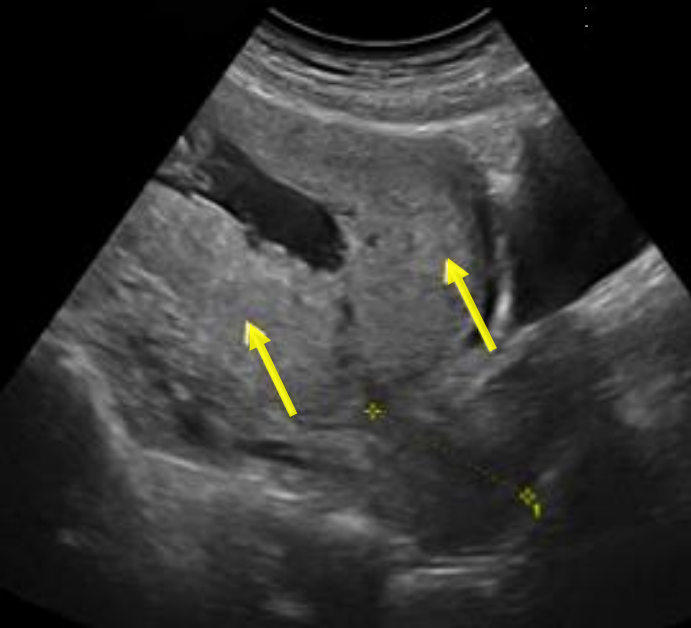
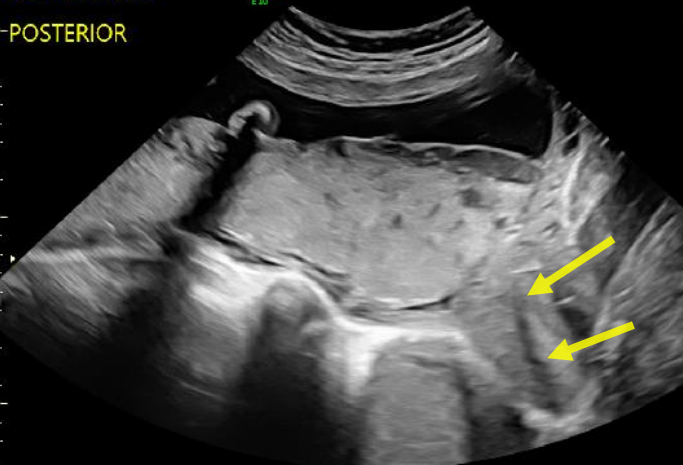
Transvaginal



Transvaginal ultrasound is key to diagnosis

SAG Placenta

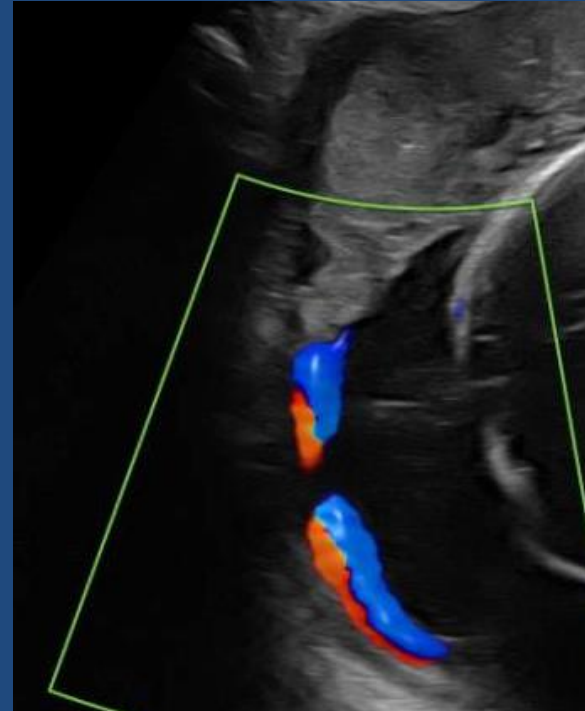
POSTERIOR



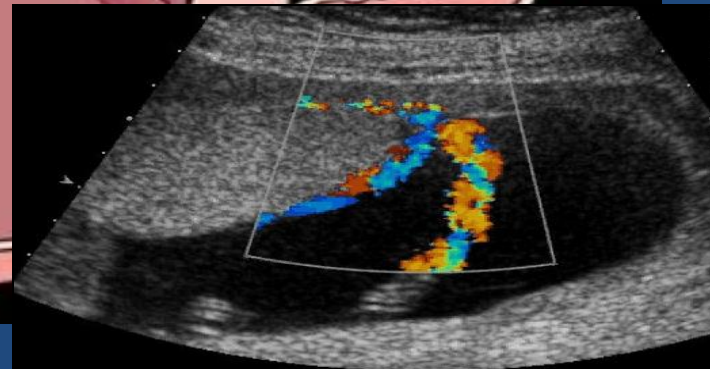
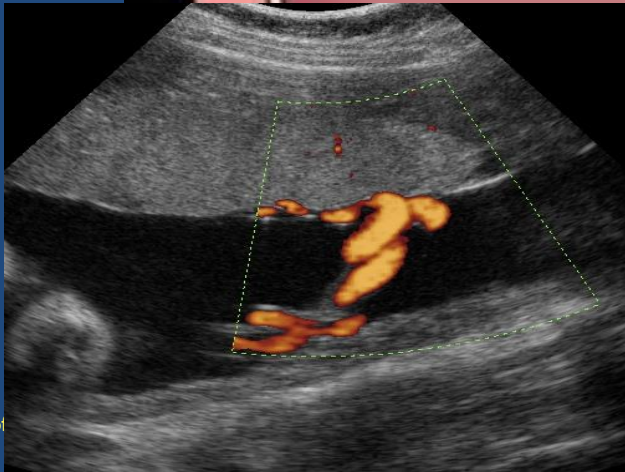
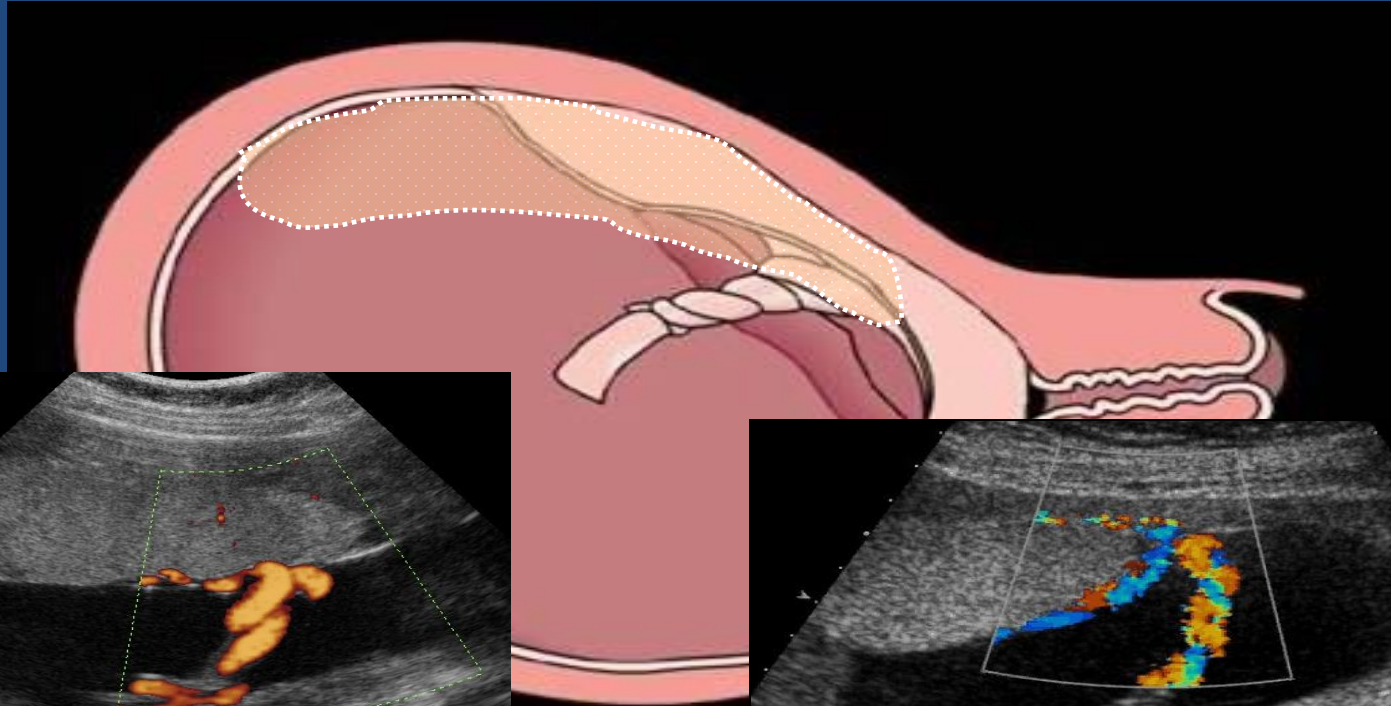
- It is recognized that apparent **placental position early in pregnancy** may not correlate well with its location at the time of delivery
- *“Trophotropism”*
 - The ability or the desire of the placenta to seek a blood supply
 - Proliferation of placental villi in areas of better blood supply (corpus, fundus)

Consequences of Placenta Migration or Trophotrophism

- Regressing previa
- Vasa previa
- Migration cord origin
- Velamentous cord origin



Trophotropism

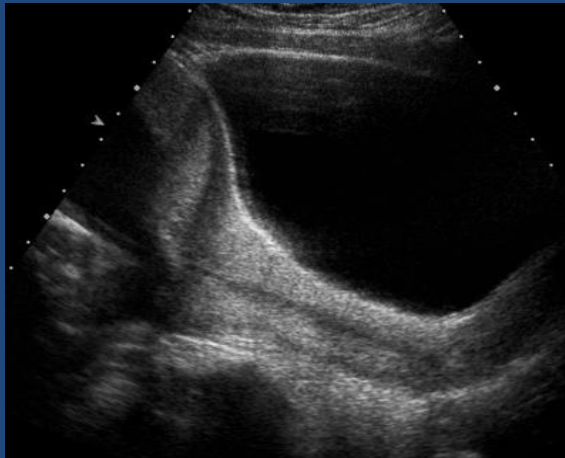


Placenta Previa: Risk Factors

- Advanced maternal age
- Multiparty
- Prior cesarean delivery
- Multifetal gestation
- Smoking
- IVF

Placenta Previa: D/Dx & Pitfalls

- Full maternal bladder
- Focal myometrial contraction
- Placental abruption



Clinical Points: Placenta Previa

- Incidence decreases as pregnancy advances
 - Most previas are asymptomatic & classically present with painless vaginal bleeding
 - Majority resolve by term
 - 0.5% incidence of continued previa at term
 - Most accurately dx with transvaginal US

SMPM Consult series #44. Management of bleeding in the late preterm period. Oct 2017
Woodward P et al Diagnostic Imaging Obstetrics, 3rd ed. 2016

Marginal Sinus Previa

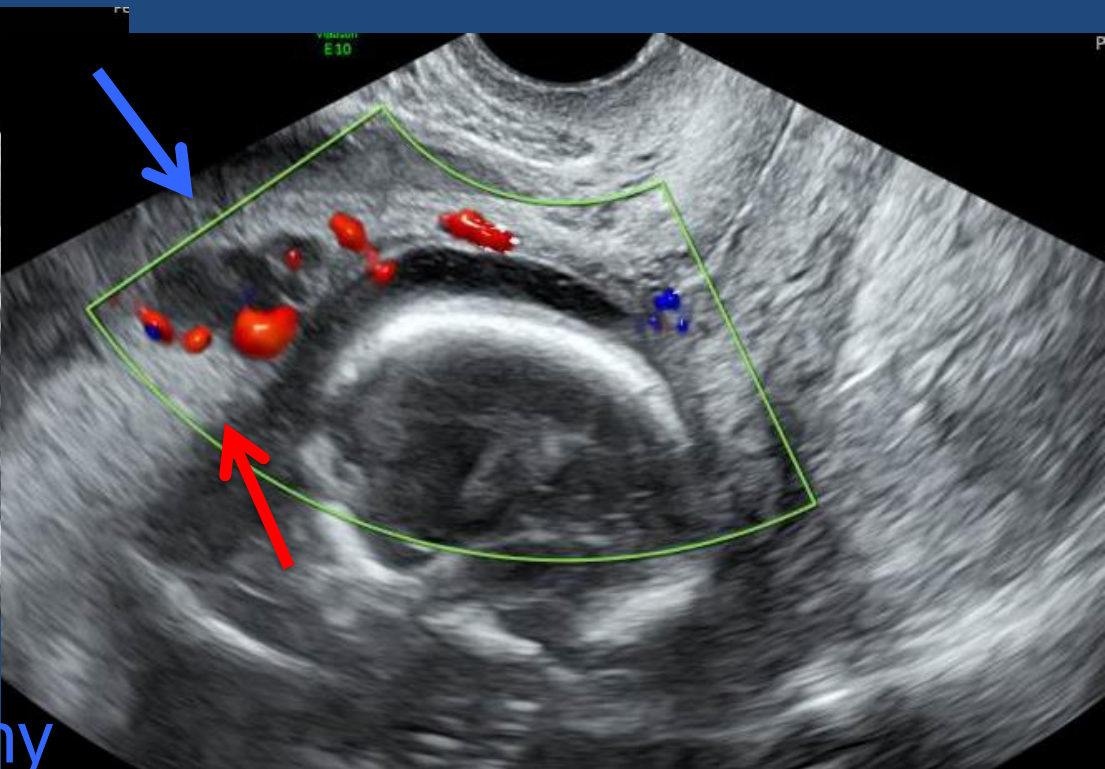
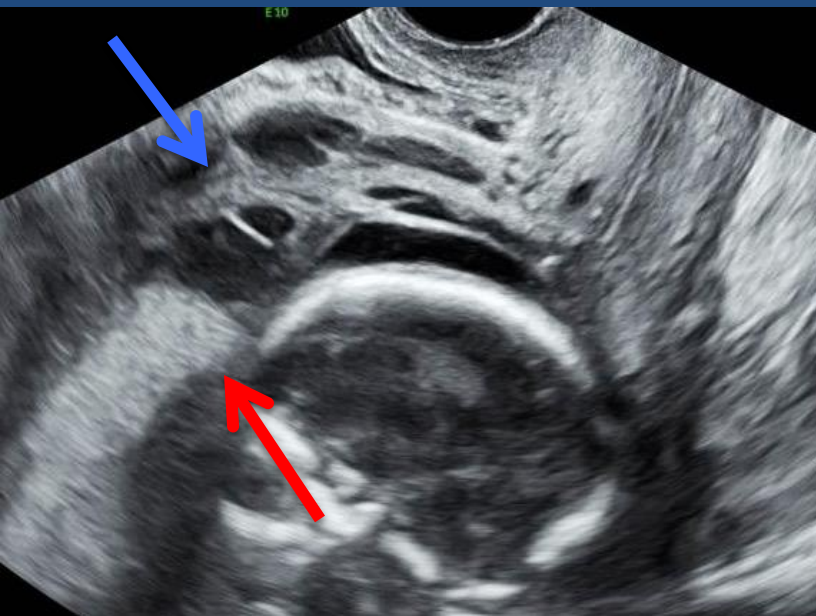
- Subset of low-lying placenta
- Placental veins at edge of placenta are <2cm from internal os
 - Maternal veins, **not fetal**
 - Do not confuse with vasa previa
- Placental parenchyma may be >2 cm from internal os



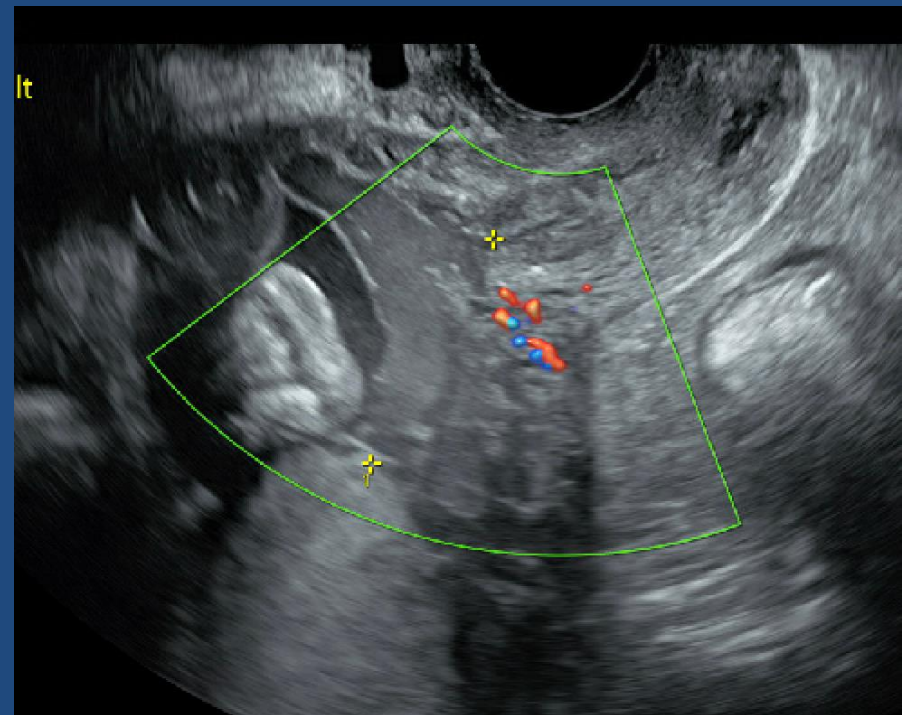
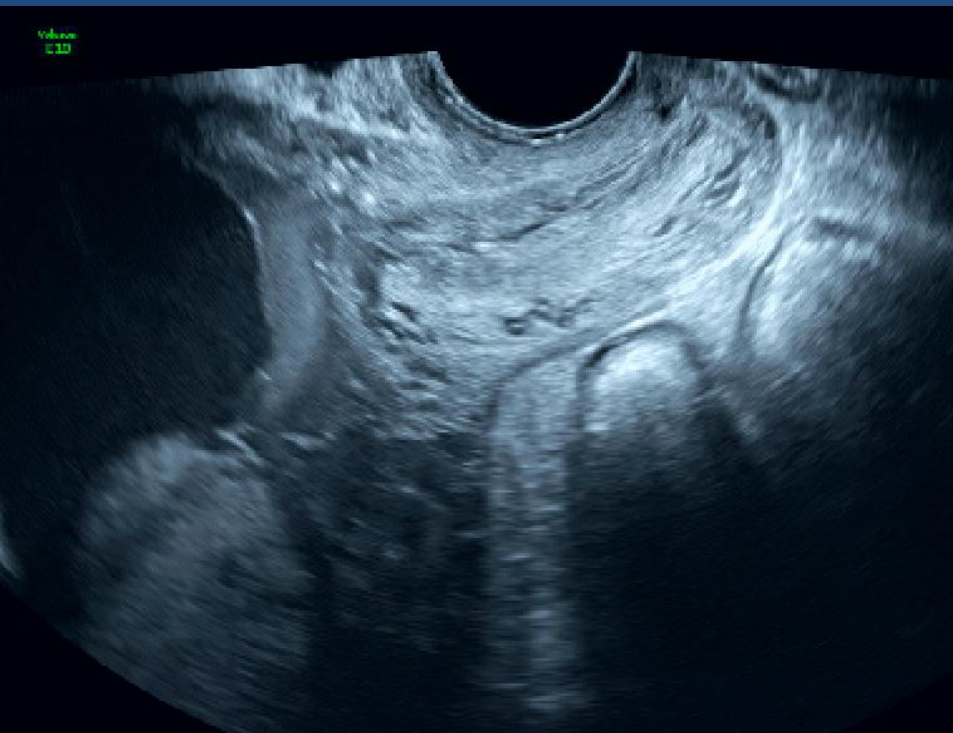
Placental location by TA sonography

Next step?

Marginal Sinus Previa



Transvaginal sonography

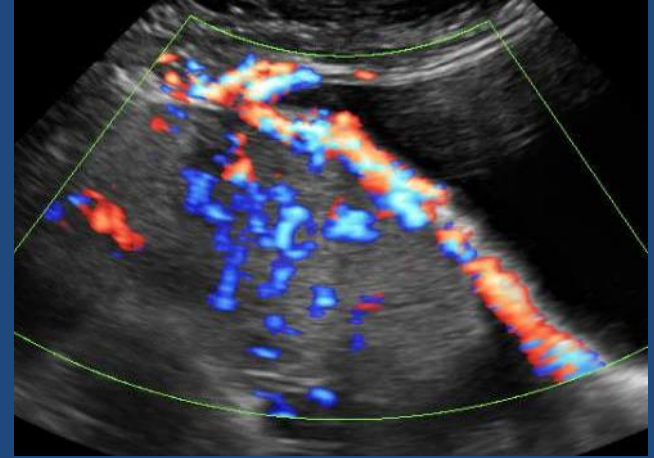
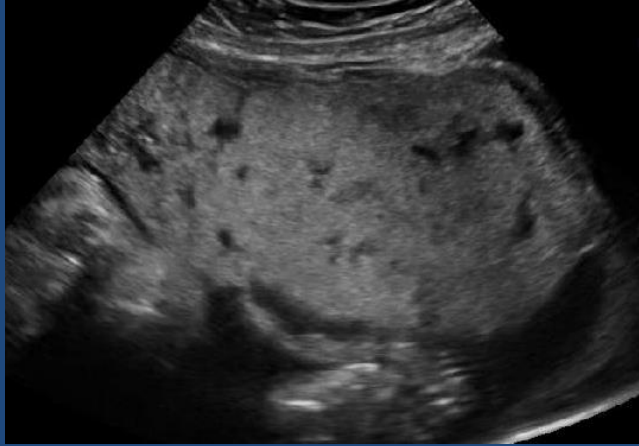


Placental Accreta Spectrum

The problem



Placenta Accreta



Placenta Accreta Spectrum

- Abnormal **trophoblast infiltration** beyond fibrinoid Nitabuch layer (attached to myometrium => **accreta**)
- Results in abnormal adherence to myometrium
- If myometrium **invaded** => **placenta increta**
- If penetrates **beyond myometrium** => **placenta percreta**
- Bleeding risk with accreta primarily related to common occurrence of coexisting placenta previa

SMFM Consult series #44. Management of bleeding in the late preterm period. Oct 2017

American College of Obstetricians and Gynecologists; Society for Maternal-Fetal Medicine. Obstetric Care Consensus No. 7: Placenta Accreta Spectrum. Obstet Gynecol. 2018 Dec;132(6):e259-e275.

Jauniaux E, Ayres-de-Campos D, Langhoff-Roos J, Fox KA, Collins S; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO classification for the clinical diagnosis of placenta accreta spectrum disorders. Int J Gynaecol Obstet. 2019 Jul;146(1):20-24.

Placenta Accreta Spectrum

- Etiology
 - Defect of the endometrial-myometrial interface
 - Leads to a failure of normal decidualization in the area of a uterine scar or damaged endometrium
 - This allows abnormally deep placental anchoring villi & trophoblast infiltration

Placenta Accreta Spectrum

Abnormal adherence of the placenta to a scarred or damaged uterine wall

Accreta

Attaches to the myometrium



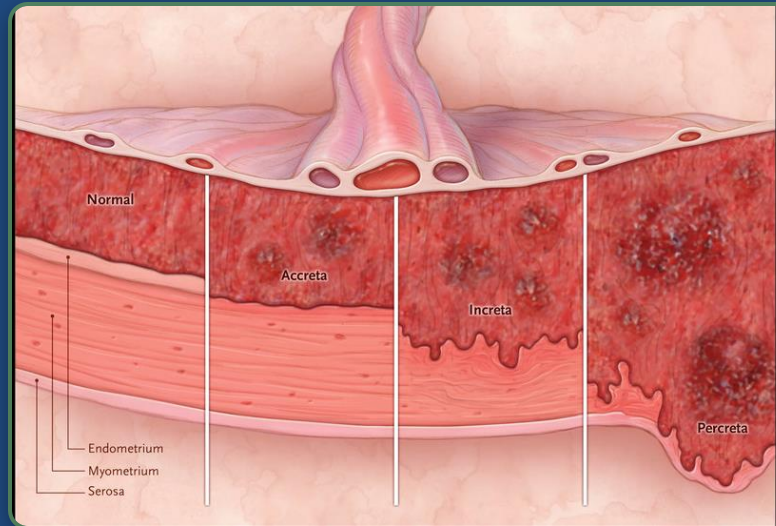
Increta

Invades into the myometrium



Percreta

Through the myometrium;
may involve the bladder

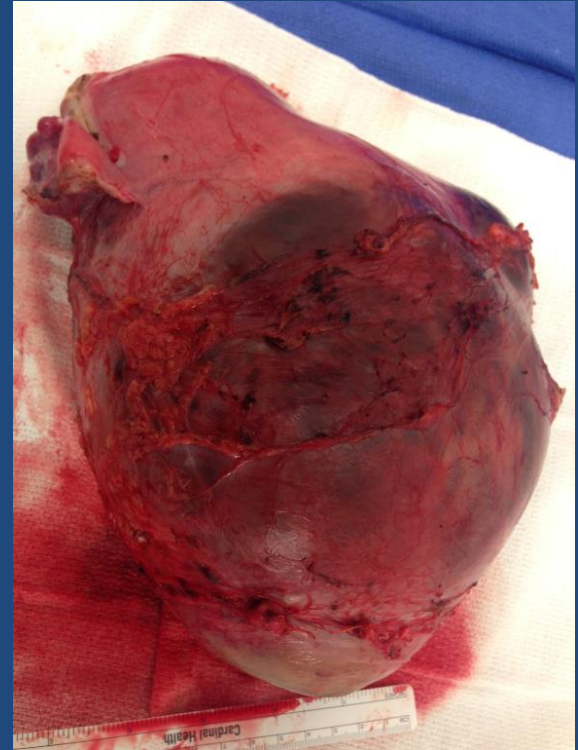


Cesarean + Placenta Previa in Current Pregnancy

Cesarean Number	Risk of Accreta
1 st Cesarean	3%
2 nd Cesarean	11%
3 rd Cesarean	40%
4 th Cesarean	61%
5 th Cesarean	67%

Risk Factors for PAS

- Prior Uterine resection
 - septum revision, myomectomy
- In Vitro Fertilization – 13-fold increase
- Endometrial ablation
- Radiation therapy
- Smoking
- Age
- Grandmultiparity

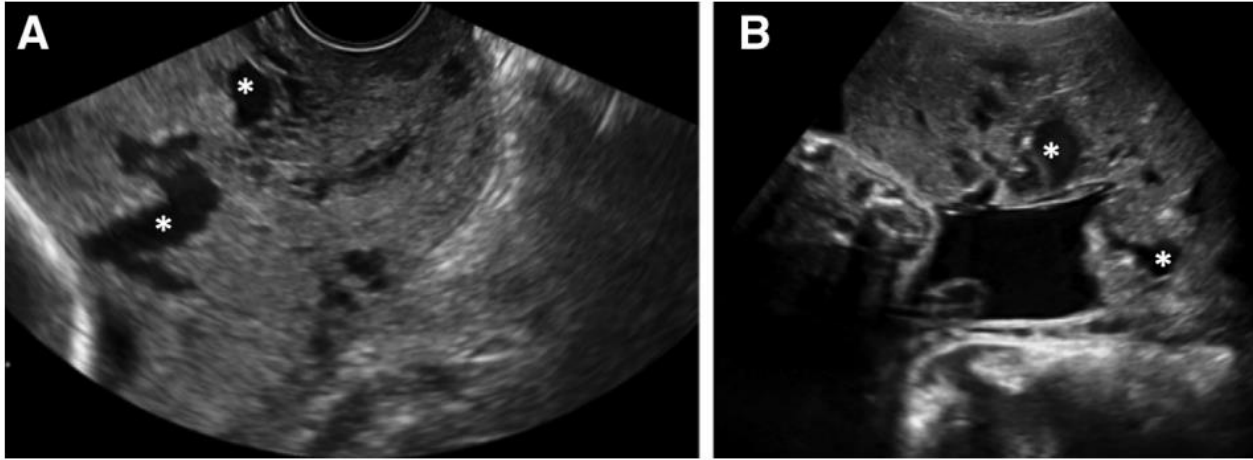


Definitions of PAS markers in the second and third trimesters of pregnancy

Marker	Definition
Placental lacunae	Irregular, hypoechoic spaces within the placenta containing vascular flow (which can be seen on grayscale and/or color Doppler imaging). The following lacunae findings are associated with high risk of PAS: - Multiple (often defined as ≥ 3) - Large size - Irregular borders - High velocity^a and/or turbulent flow within
Abnormal uteroplacental interface	Loss of the retroplacental hypoechoic zone between the placenta and myometrium.^b This marker is often located along the posterior bladder wall resulting in partial or complete interruption or irregularities of the uterovesical interface. Thinning of the retroplacental myometrium (previously described as myometrial thickness of < 1 mm).
Abnormal uterine contour (placental bulge)	Placental tissue distorting the uterine contour resulting in a bulge-like appearance.
Exophytic mass	Placental tissue extruding beyond the uterine serosa.
Bridging vessel	Vessel that extends from the placenta across the myometrium and beyond the uterine serosa.

Shanker SA, et al; Society for Maternal-Fetal Medicine. Electronic address: pubs@smfm.org. Special Report of the Society for Maternal-Fetal Medicine Placenta Accreta Spectrum Ultrasound Marker Task Force: Consensus on definition of markers and approach to the ultrasound examination in pregnancies at risk for placenta accreta spectrum. Am J Obstet Gynecol. 2021 Jan;224(1):B2-B14

Placenta lacunae



Shanker SA, et al; Society for Maternal-Fetal Medicine.
Electronic address: pubs@smfm.org. Special Report of the
Society for Maternal-Fetal Medicine Placenta Accreta Spectrum
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markers and approach to the ultrasound examination in
pregnancies at risk for placenta accreta spectrum. *Am J Obstet
Gynecol.* 2021 Jan;224(1):B2-B14

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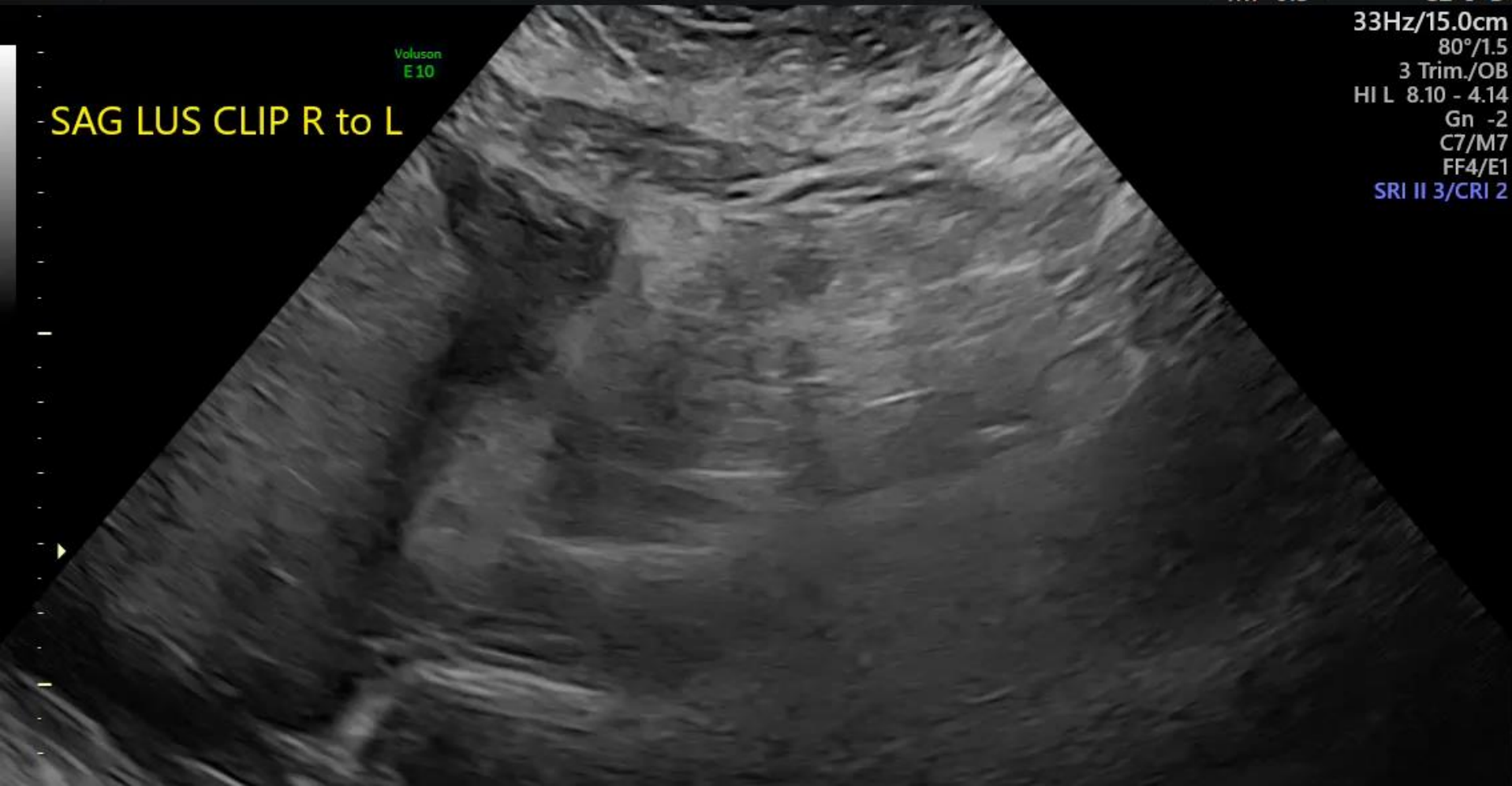
33Hz/15.0cm
80°/1.5
3 Trim./OB
HI L 8.10 - 4.14
Gn -2
C7/M7
FF4/E
SRI II 3/CRI 2



Voluson
E10

SAG LUS CLIP R to L

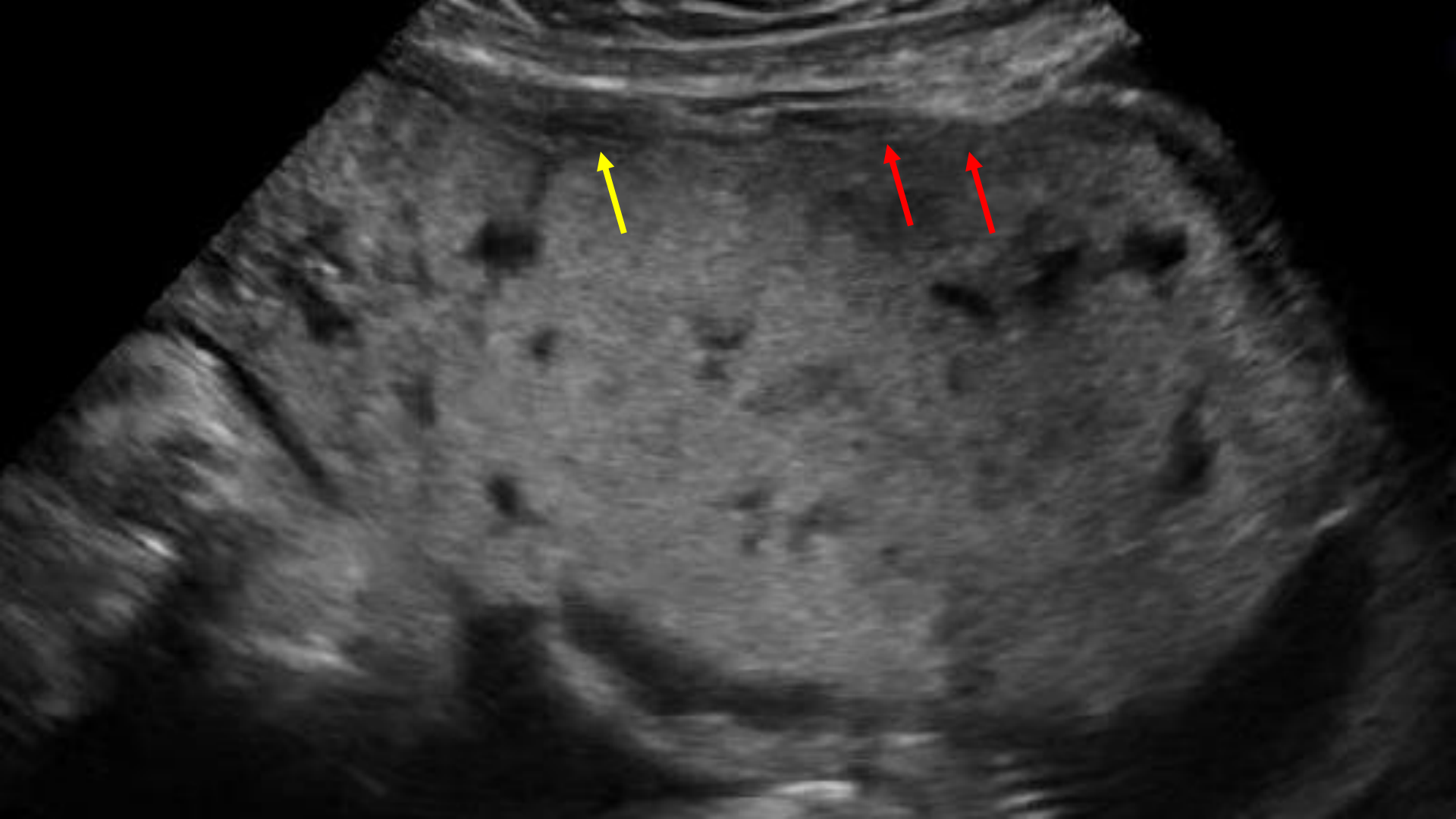
33Hz/15.0cm
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Gn -2
C7/M7
FF4/E1
SRI II 3/CRI 2



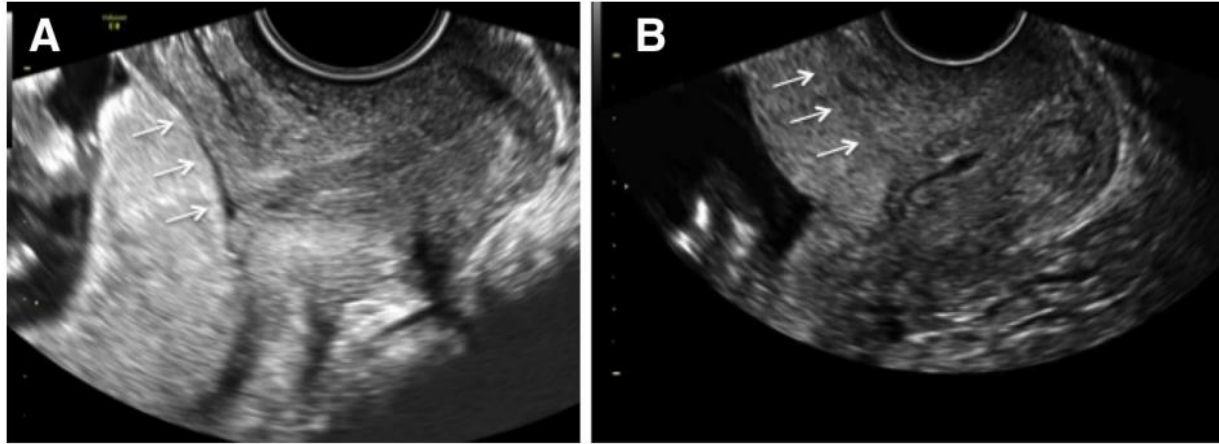
Myometrial thinning



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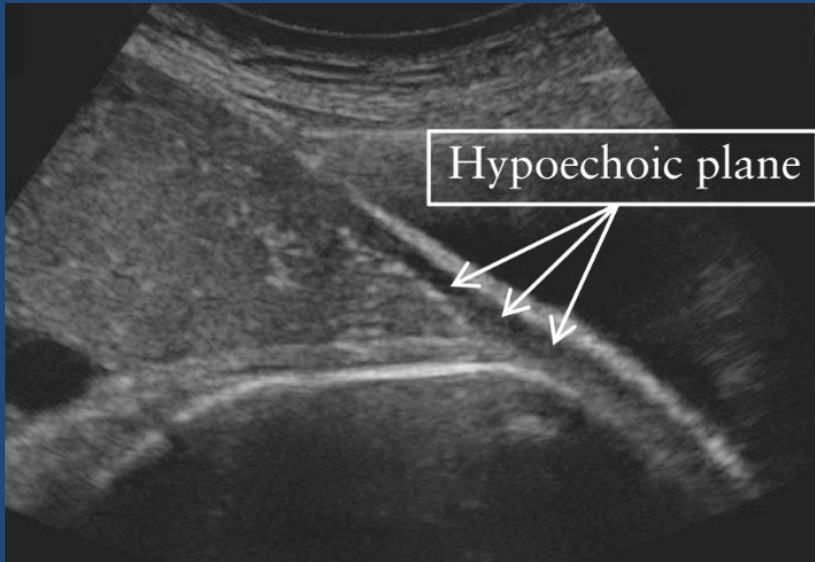
Retroplacental hypoechoic zone



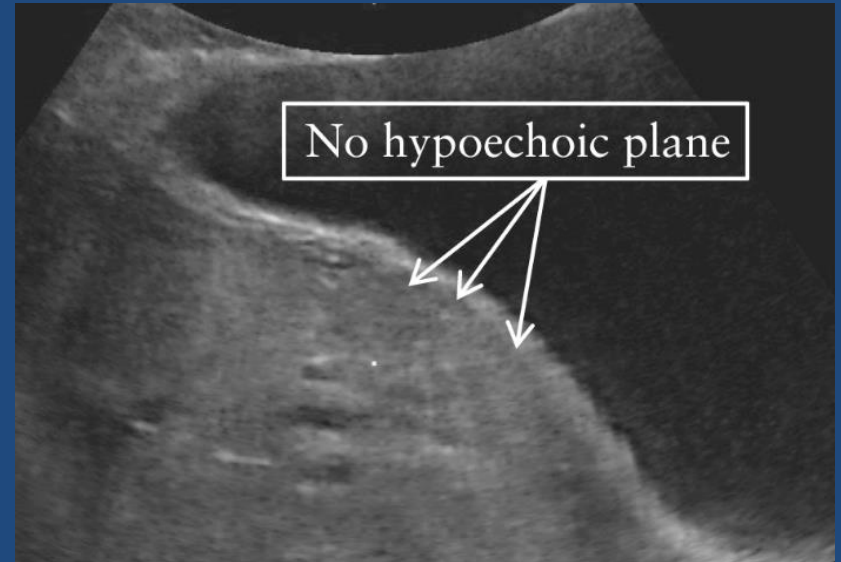
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Evaluating the Retroplacental “Clear Zone”

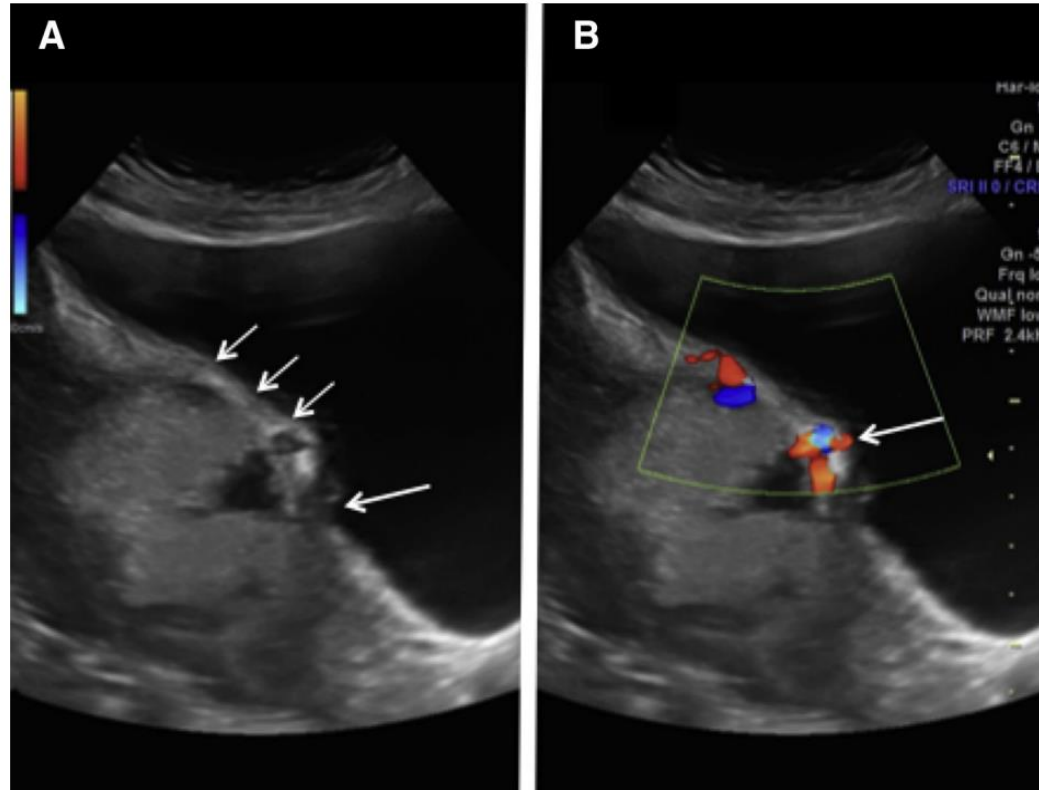
Normal — clear zone intact



Placenta invading myometrium

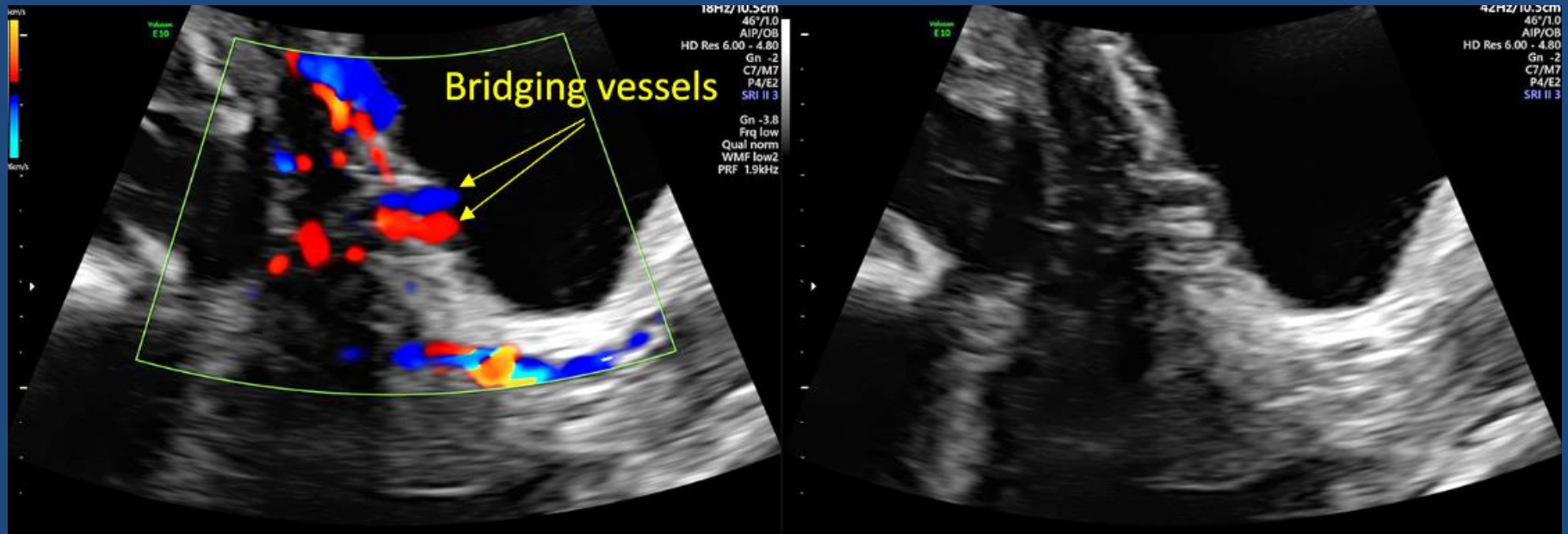


Abnormal uterine contour and bridging vessel



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Bridging Vessels



Sonographic tips and best practices

1

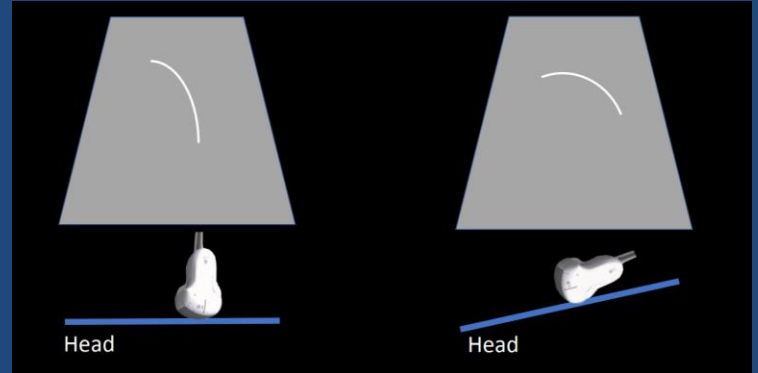
Angle of insonation

- Aim for 90° to the bladder wall
- Use Trendelenburg to get there

2

Transducer pressure

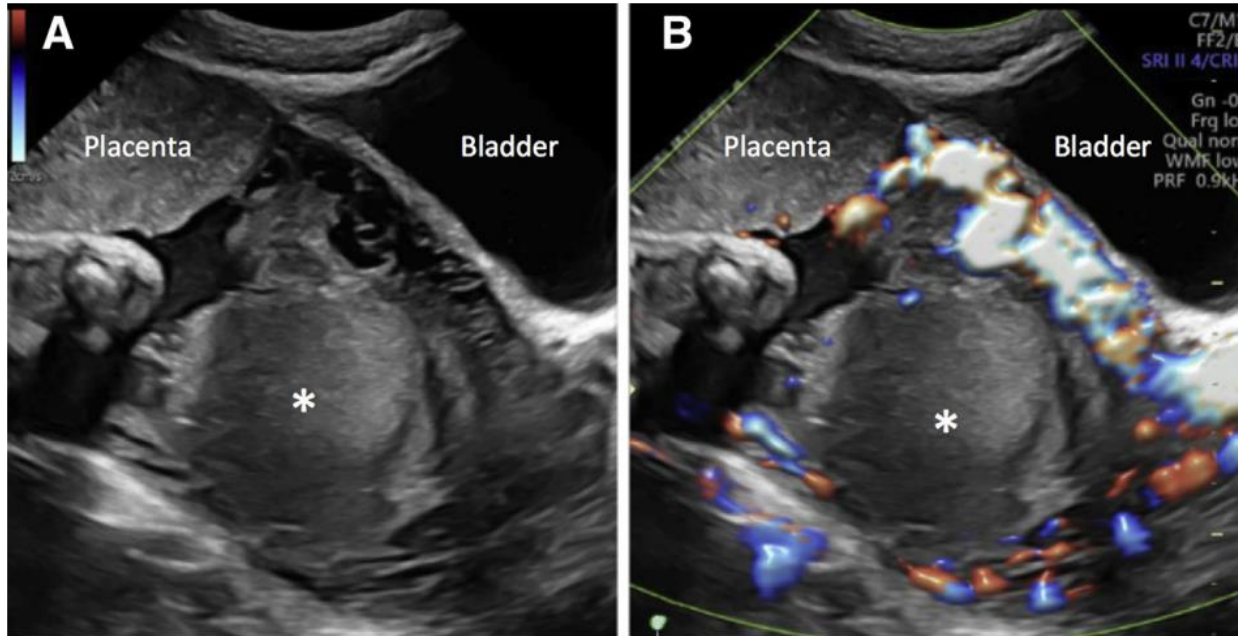
- Use a light touch
- Too much pressure hides the finding



Maynard H, Zamudio S, Jauniaux E, Collins SL. The importance of bladder volume in the ultrasound diagnosis of placenta accreta spectrum disorders. *Int J Gynaecol Obstet*. 2018 Mar;140(3):332-337. doi: 10.1002/igo.12370. Epub 2017 Nov 26. PMID: 29086915; PMCID: PMC6449684.

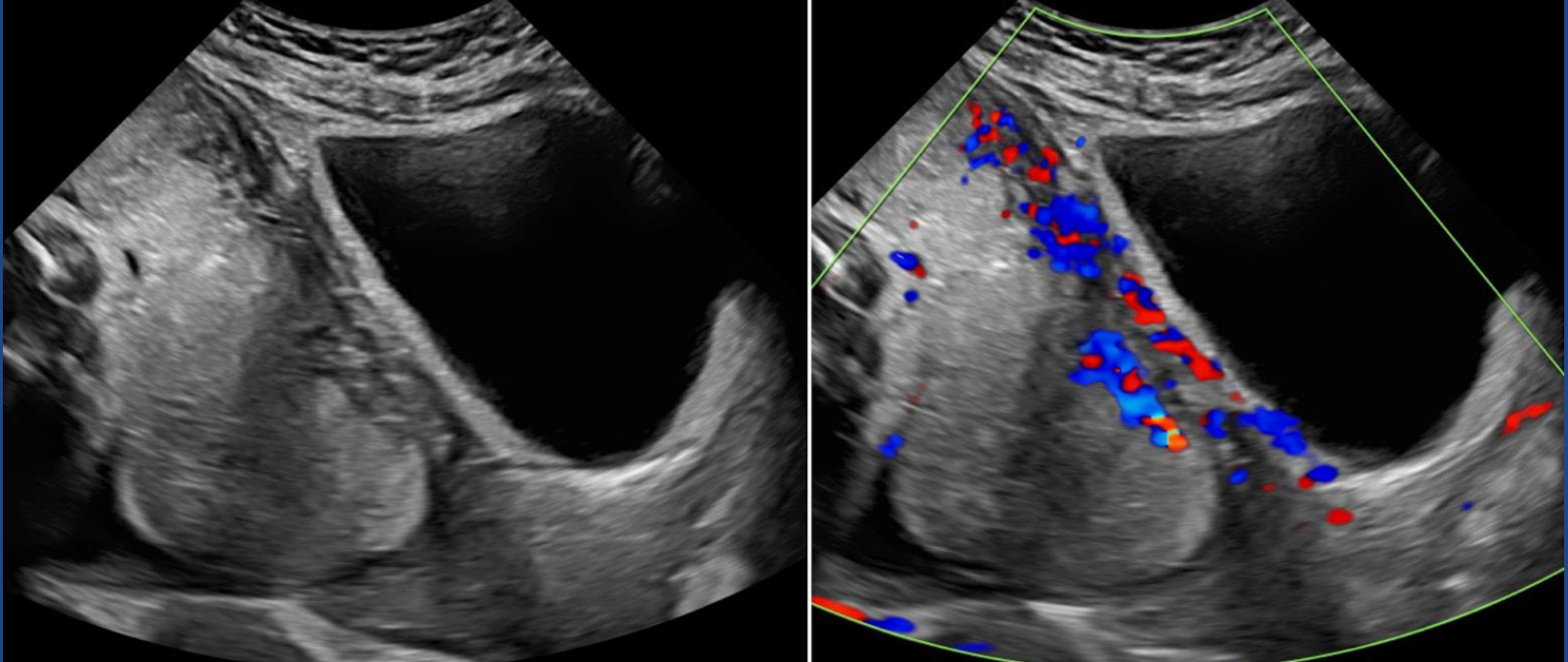
Angle and pressure can create — or erase — the finding

Hypervascularity of the uterovesical space

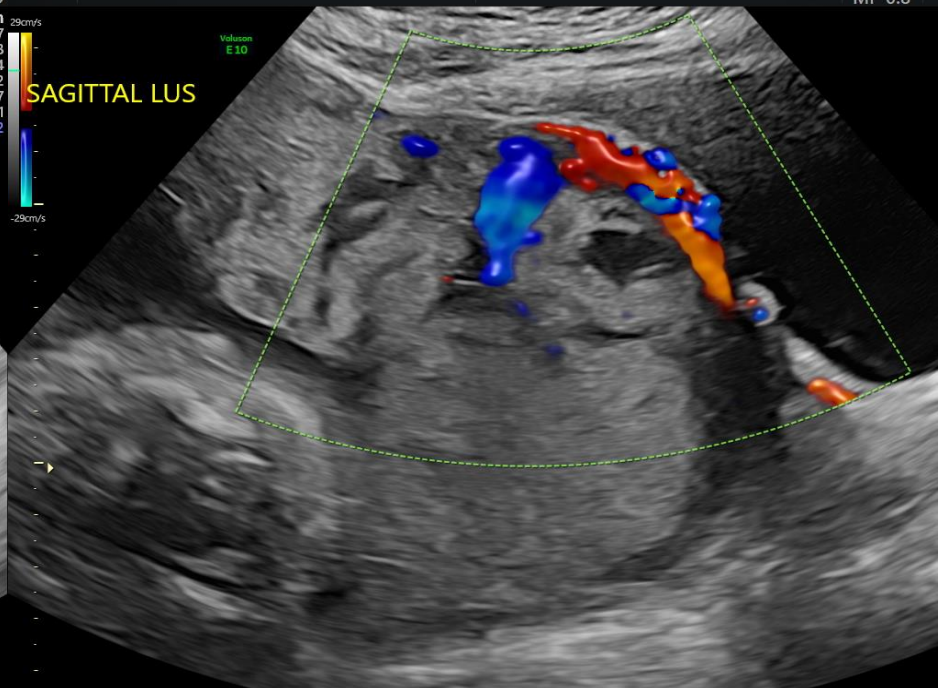
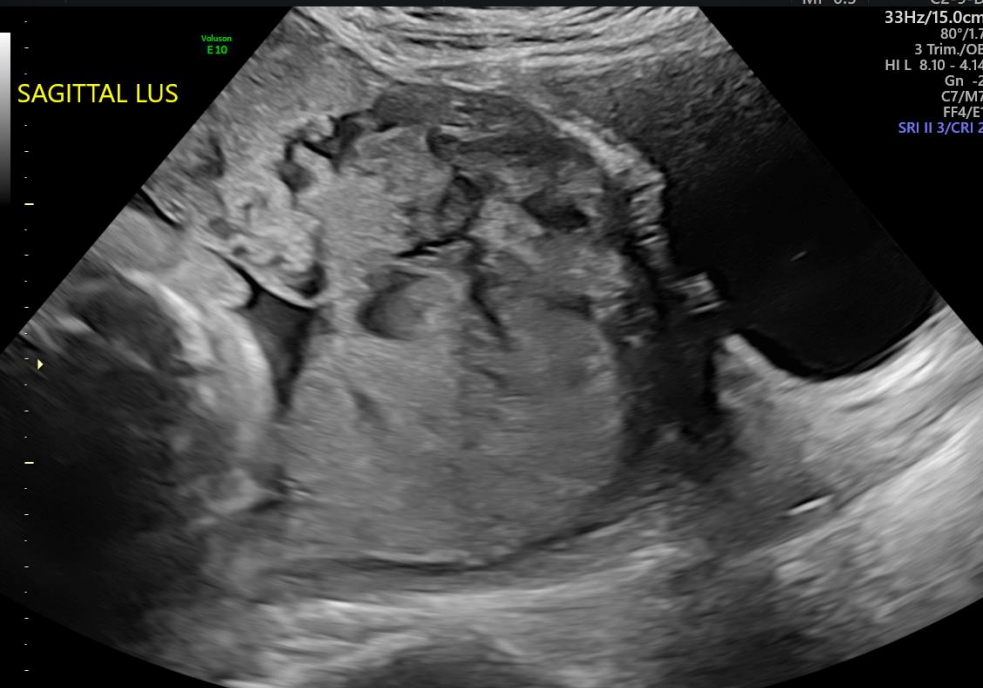


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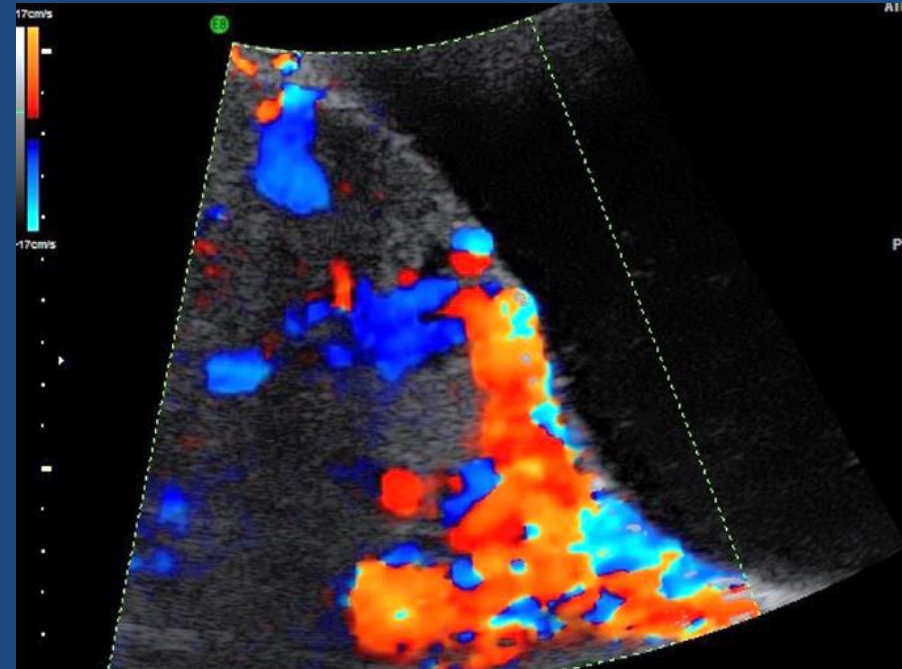
Hypervascularity



33Hz/15.0cm
80°/1.7
3 Trim./OB
HI L 8.10 - 4.14
Gn -2
C7/M7
FF4/E1
SRI II 3/CRI 2



Bladder Wall Interruption



Voluson™
E10
COMP

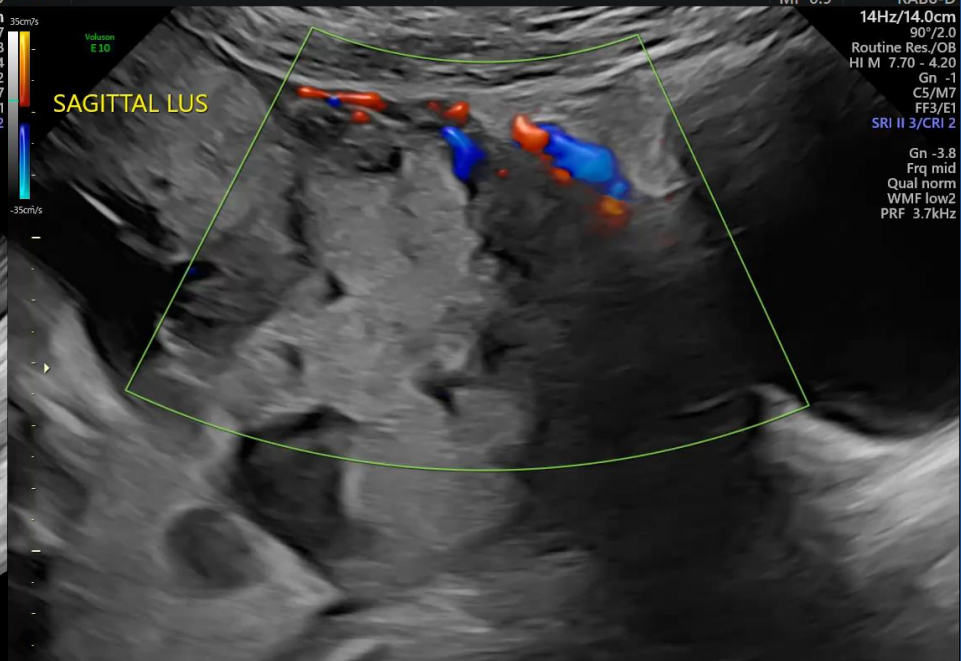
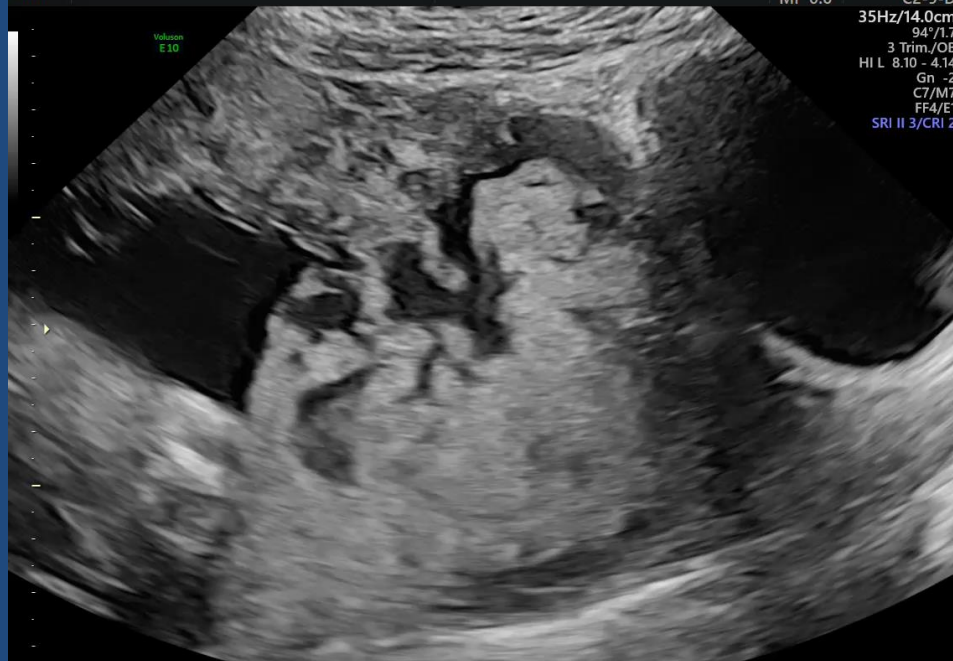
TIs <0.1
Tlb <0.1
MI 0.6

03/06/2025
3:59:24 PM
C2-9-D

Voluson™
E10
COMP

TIs 0.4
Tlb 0.4
MI 0.9

03/06/2025
3:59:26 PM
RAB6-D



23cm/s



-23cm/s

Voluson
E10

SAG LUS CLIP R to L

11Hz/15.0cm

80°/1.5

3 Trim./OB

HI L 8.10 - 4.14

Gn -2

C7/M7

FF4/E1

SRI II 3/CRI 2

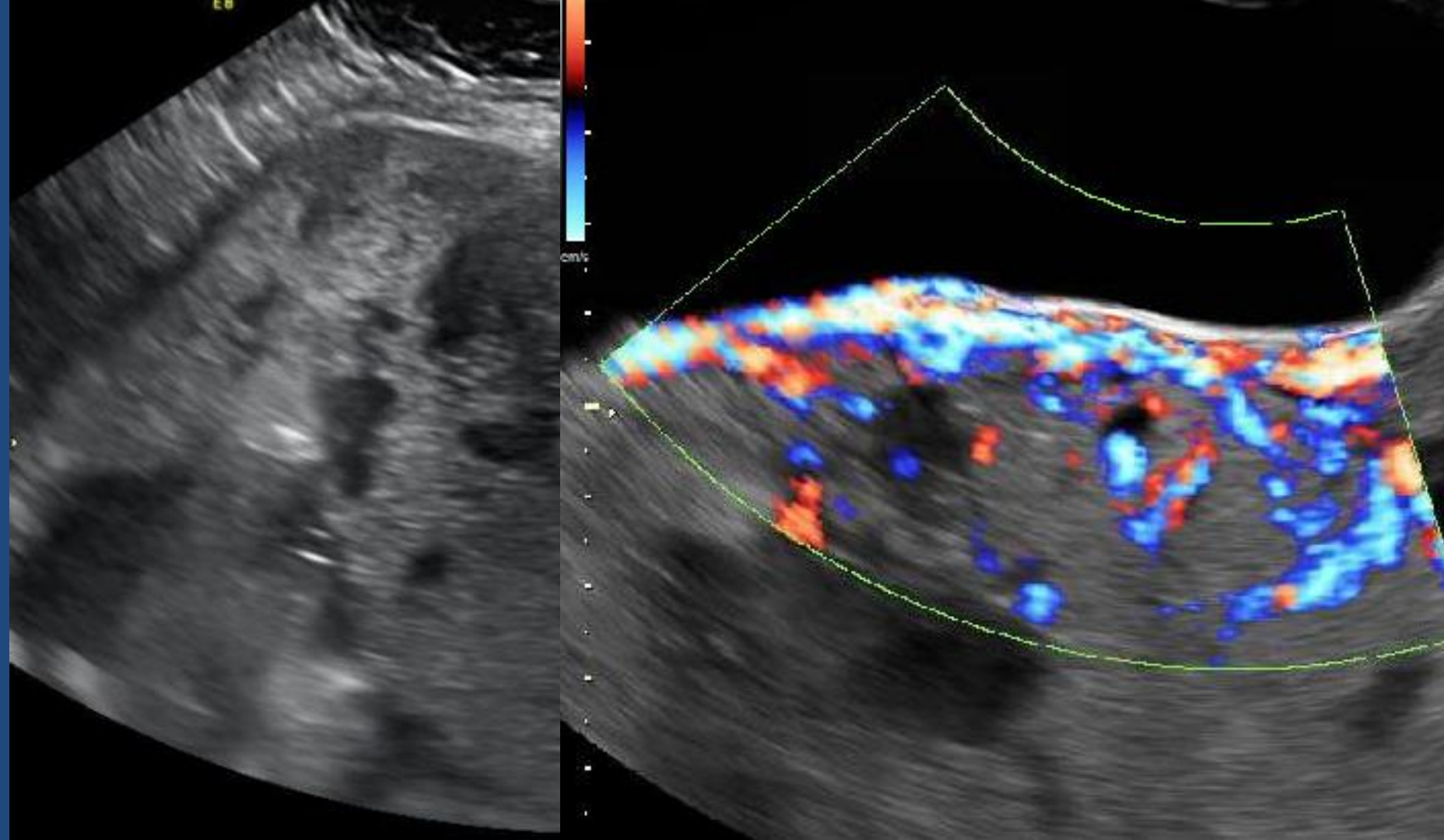
Gn -2.2

Frq low

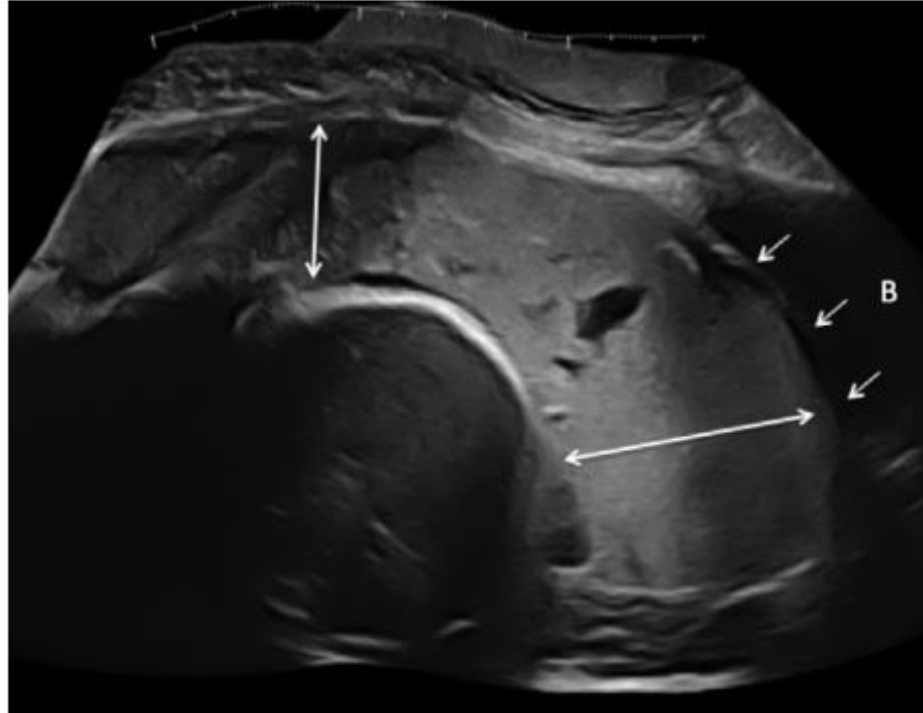
Qual norm

WMF low2

PRF 1.8kHz



Abnormal uterine contour



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Ultrasound Marker with the Strongest Association with PAS

- Persistent placenta previa at the time of delivery in the setting of a previous cesarean delivery

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Placental Abruption

Placental Abruption

- Placental separation (partial or complete) prior to delivery
- Presentation => abdominal pain & vaginal bleeding
- Risk factors
 - Hypertension, smoking, PPRM
 - Cocaine use, uterine myomas
 - Previous abruption

Placental Abruption: Diagnosis

- Best by history & clinical presentation
- US fails to detect abruption in ~20-50% of cases
- Small proportion of women with abruption present without vaginal bleeding
 - Consider dx if NRFHR tracing & uterine irritability on toco
- Often a dx of exclusion

LONG ANT UT

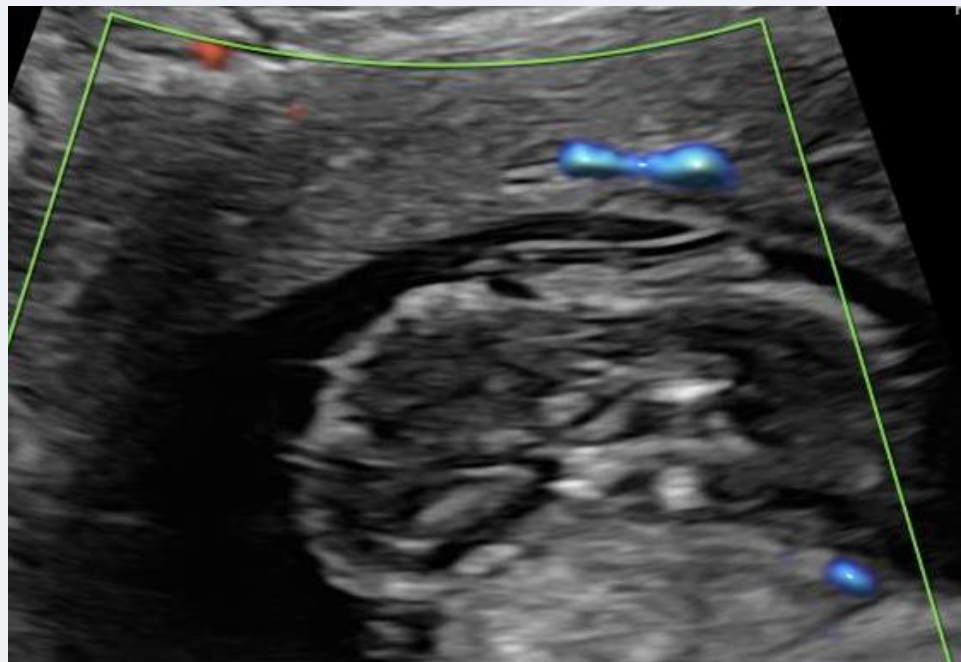
Uterine fibroid ?

Placental abruption?

LONG ANT UT

Voluson
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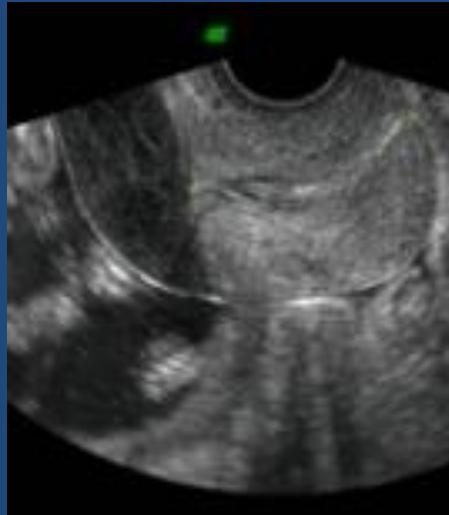


15 minutes later

Resolved focal uterine contraction

Placental Abruption: Imaging tips

- Appearance depends on age & size of hematoma
 - Acute hematoma => often isoechoic to placenta (no flow)
 - Subacute hematoma => hypoechoic to placenta (septations)
 - Resolving/chronic hematoma => sonolucent

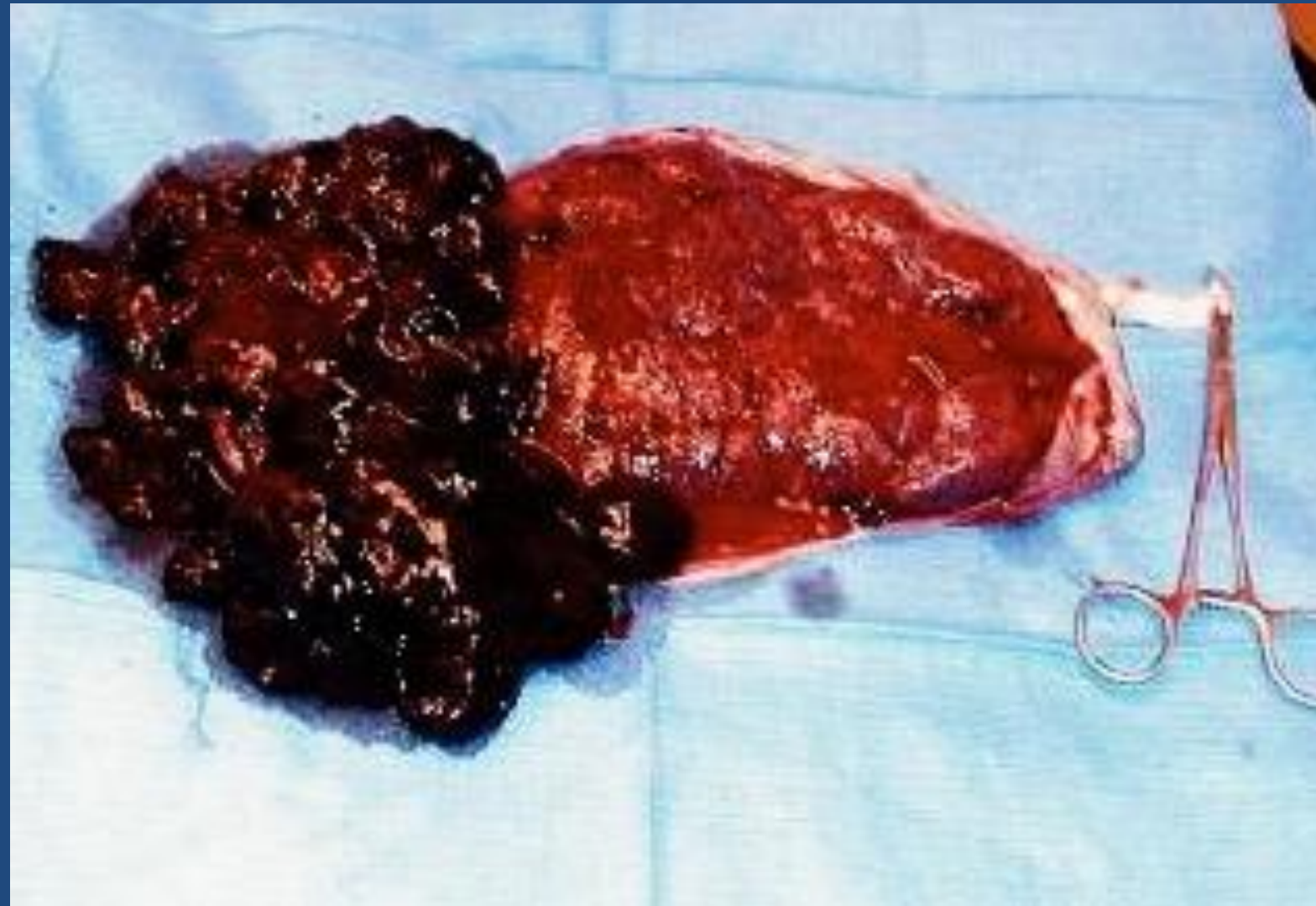


Placental Abruption: Imaging tips

- Marginal abruption (most common)
 - Hemorrhage from edge of placenta
- Retroplacental abruption (2nd most common)
 - Hematoma between placenta & uterus
- Preplacental abruption (rare)
 - Hematoma on fetal surface of placenta (preplacental sonolucency; subchorionic or subamniotic clot)



Marginal placental abruption

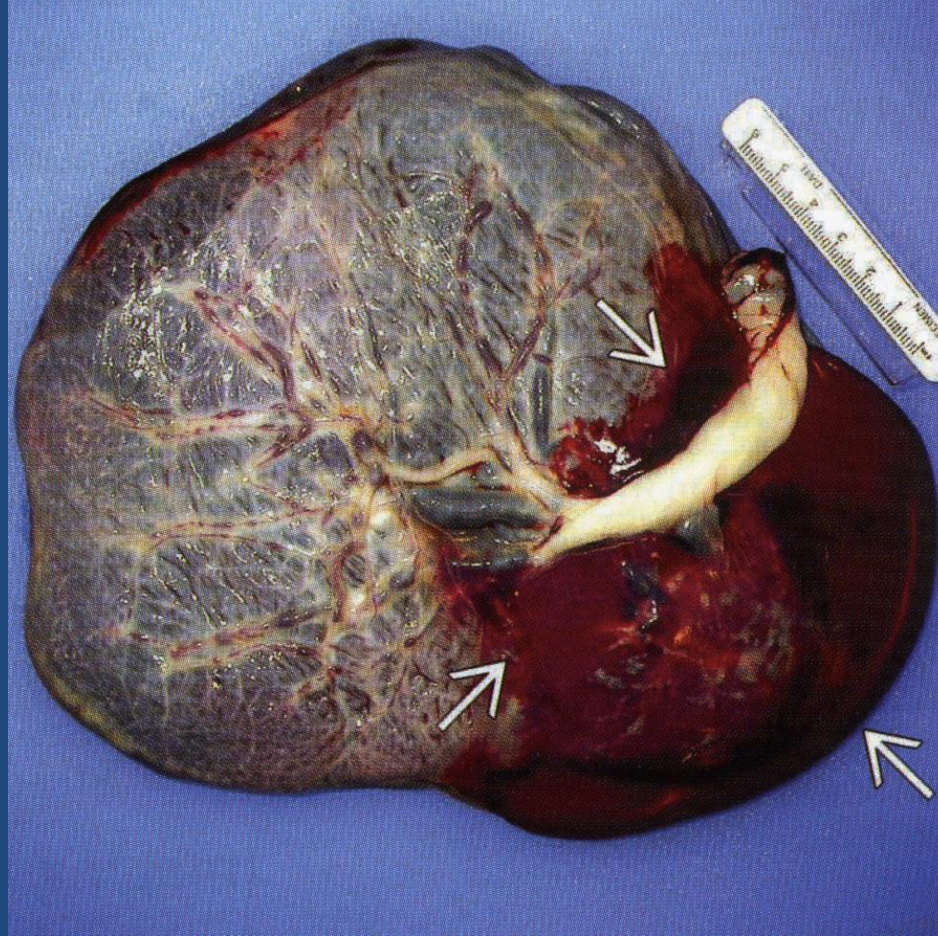




Preplacental hemorrhage



Hematoma of placental surface

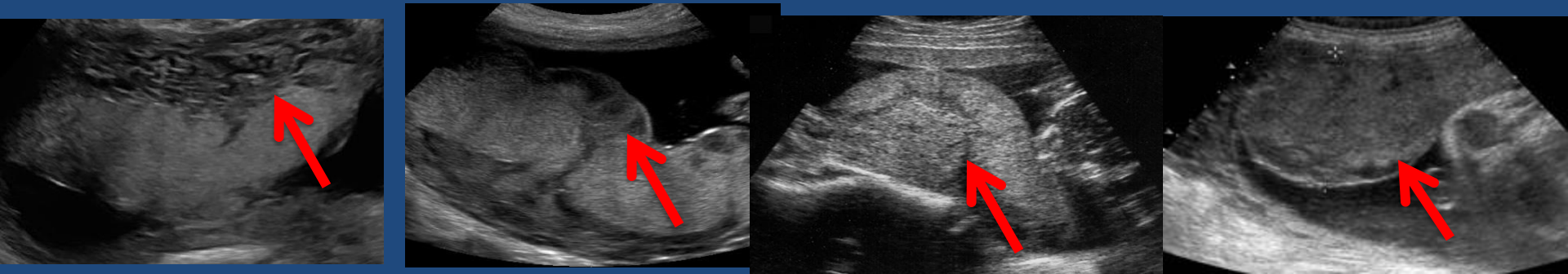


Large preplacental hemorrhage



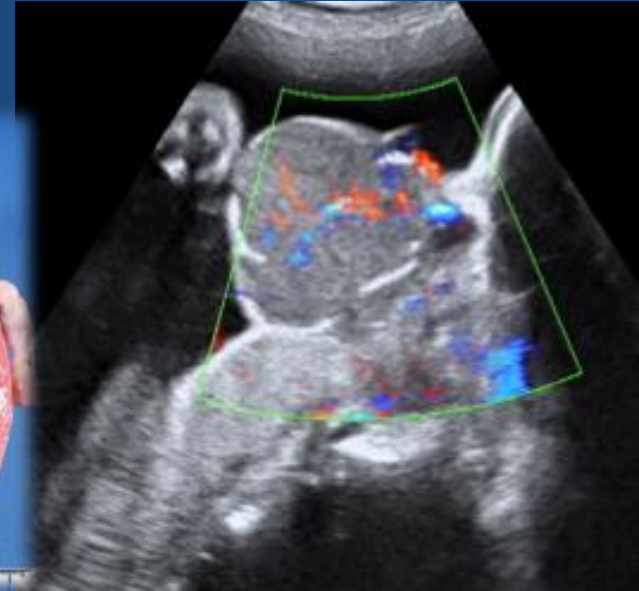
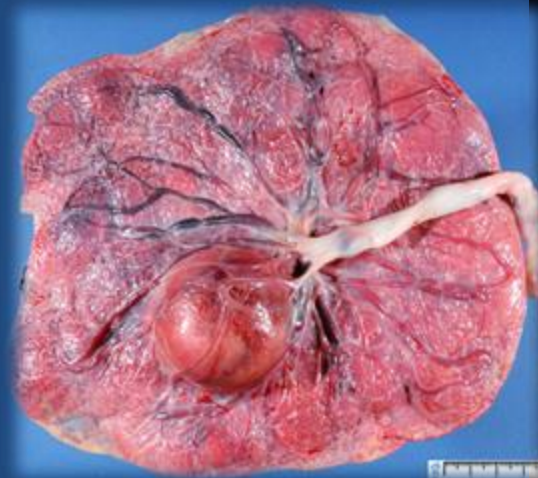
Placental Abruption – Imaging Pitfalls

- Subplacental veins
- Acute placental hemorrhage
- Myometrial contraction
- Fibroids



Placenta Abruption: D/Dx

- Leiomyoma
- Focal myometrial contraction
- Chorioangioma



Vasa Previa

Vasa Previa

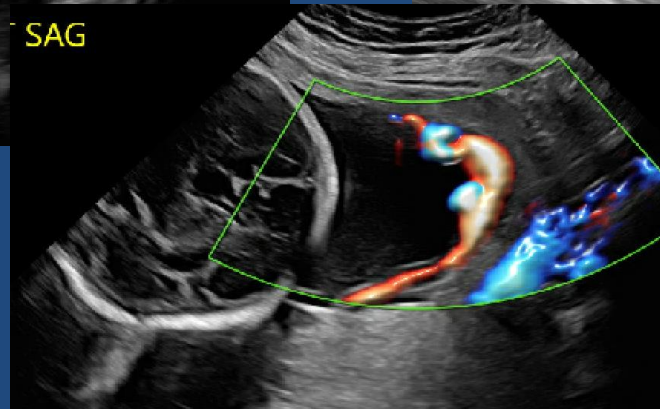
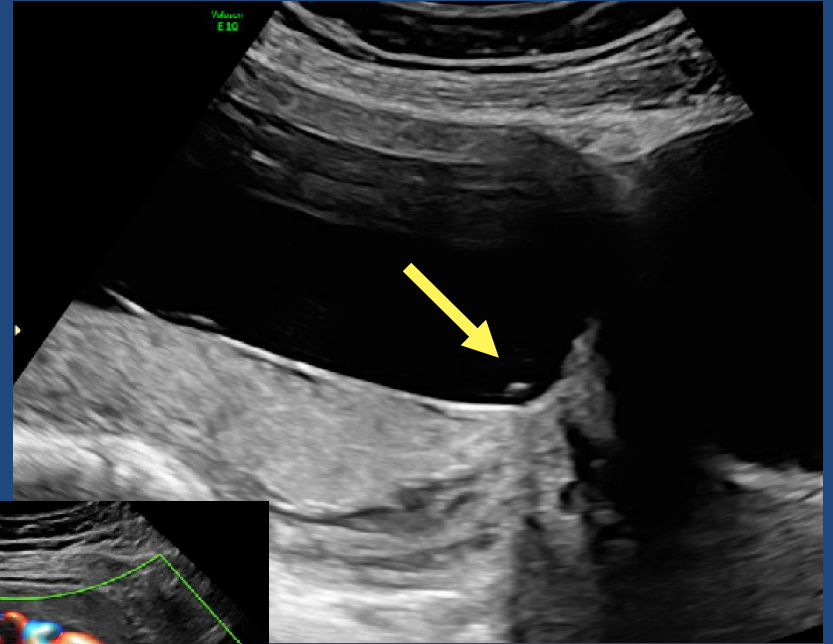
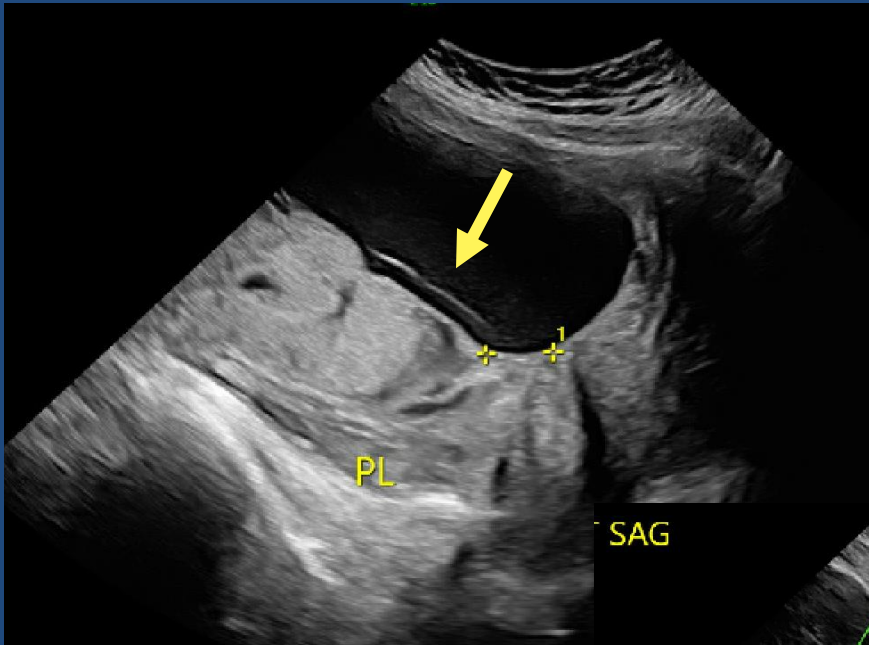
- Less common but potentially devastating condition
- Occurs when fetal vessels course through membranes & cross the internal cervical os
- Suspect in cases of velamentous CI, after resolved placenta previa or known succenturiate lobe
- Other risk factors => IVF & multiple gestations



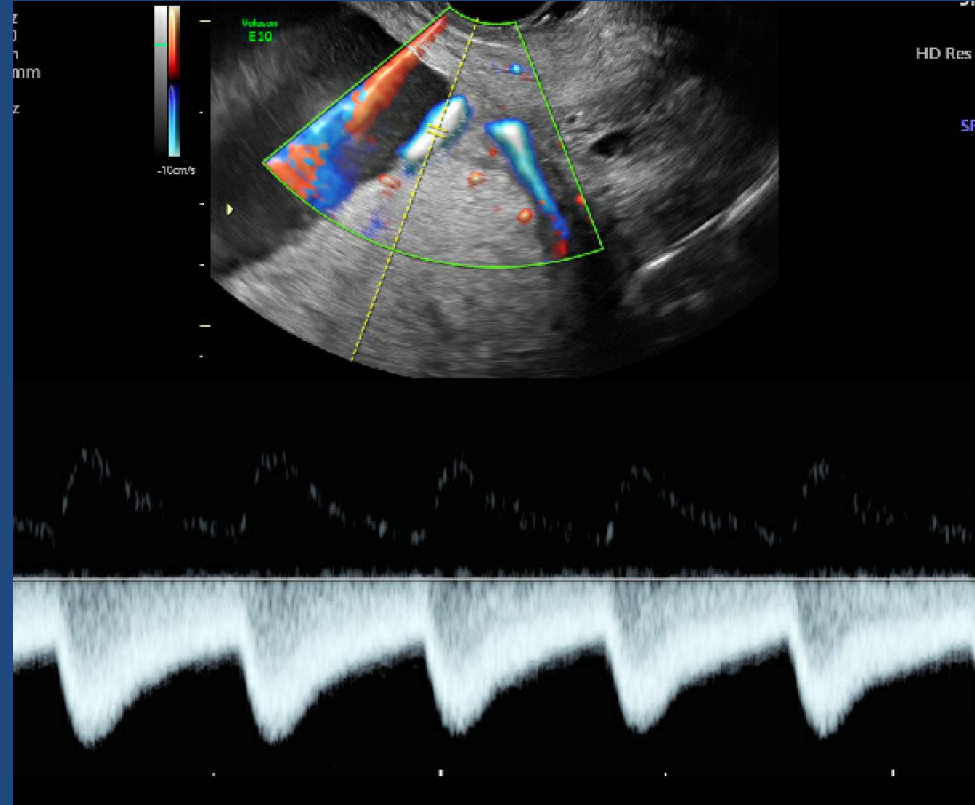
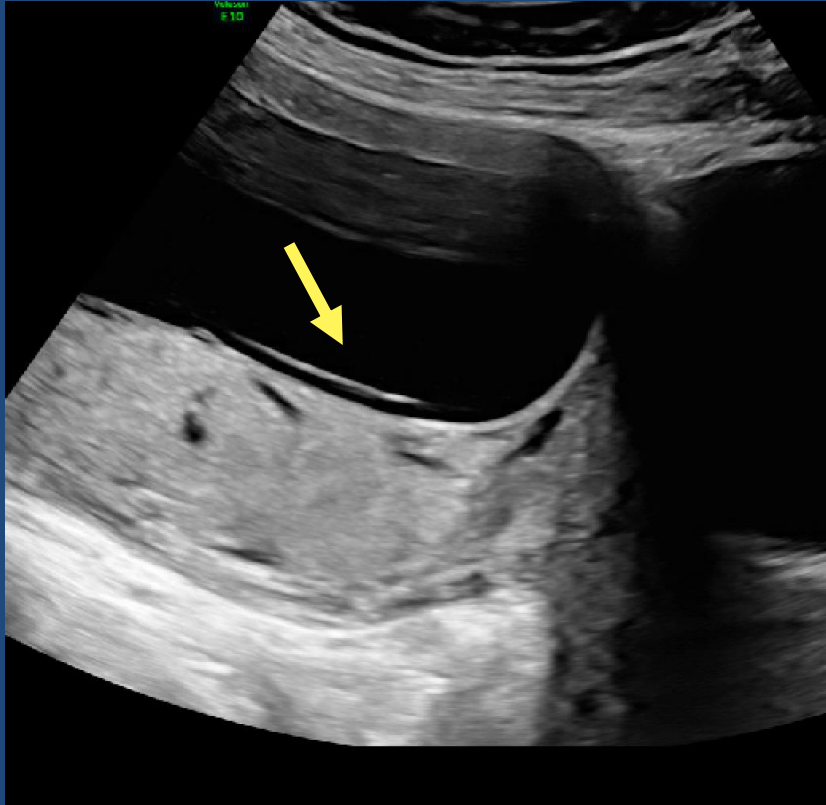
Vasa Previa

- Submembranous fetal vessels near cervical os
 - Unprotected vessels are at risk for compression from fetal head in 3rd trimester & tearing
 - Vessel covers or is < 2cm from internal os
- 90% associated with low-lying placenta
- TV sonography + color/pulsed Doppler are key
- Reposition patient, as a free loop of cord near cervix will move

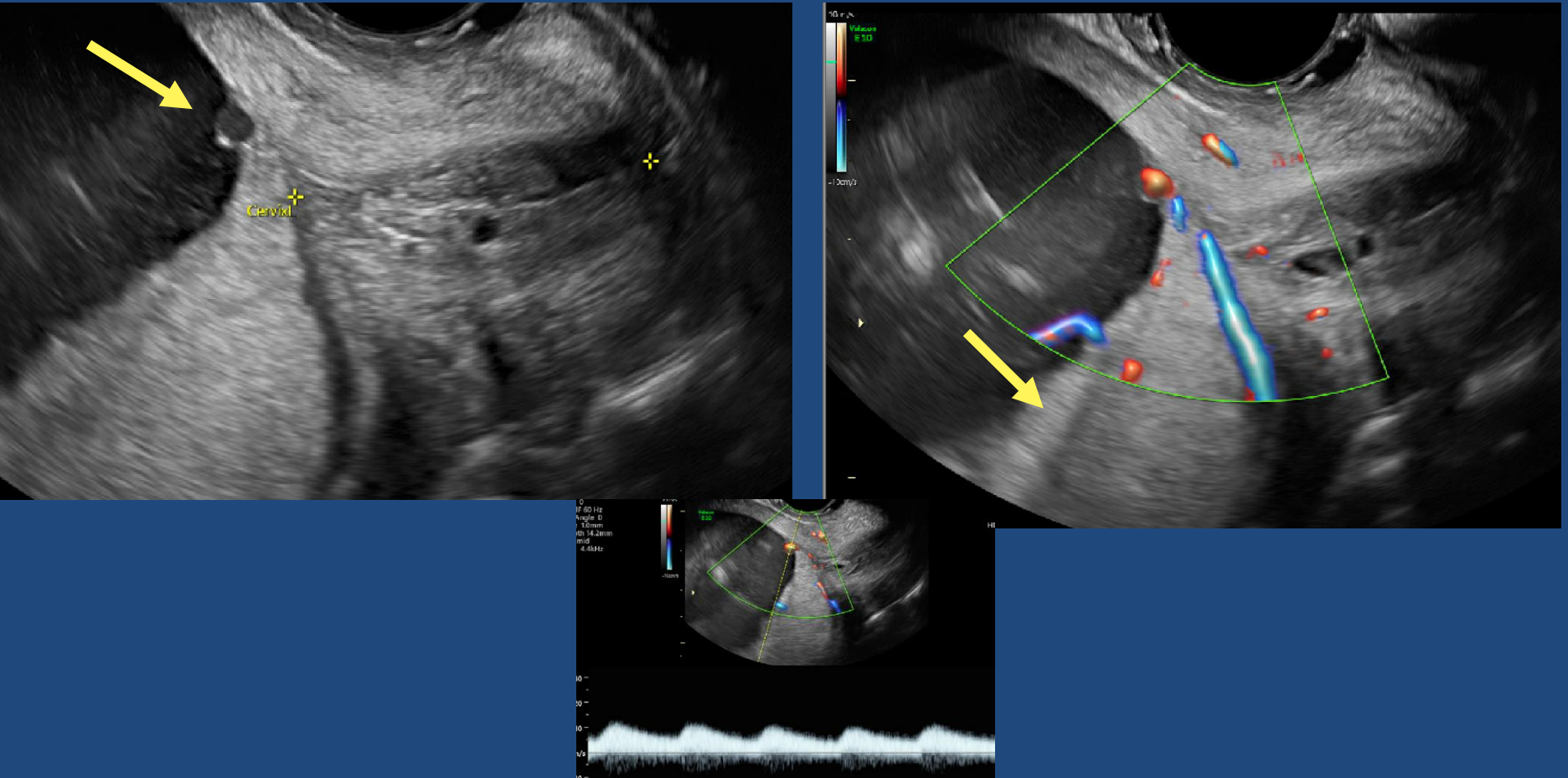
Vasa Previa: lines & bubbles



Vasa Previa: lines & bubbles

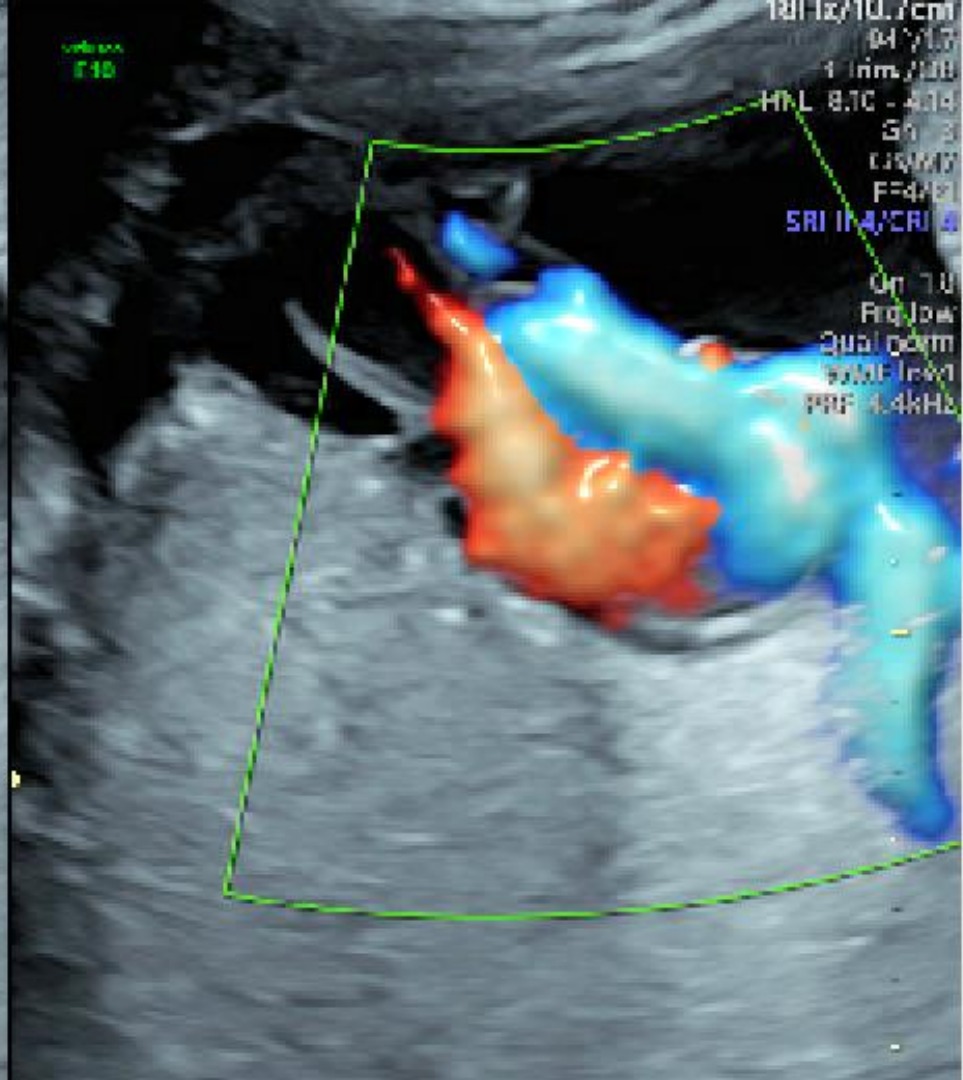
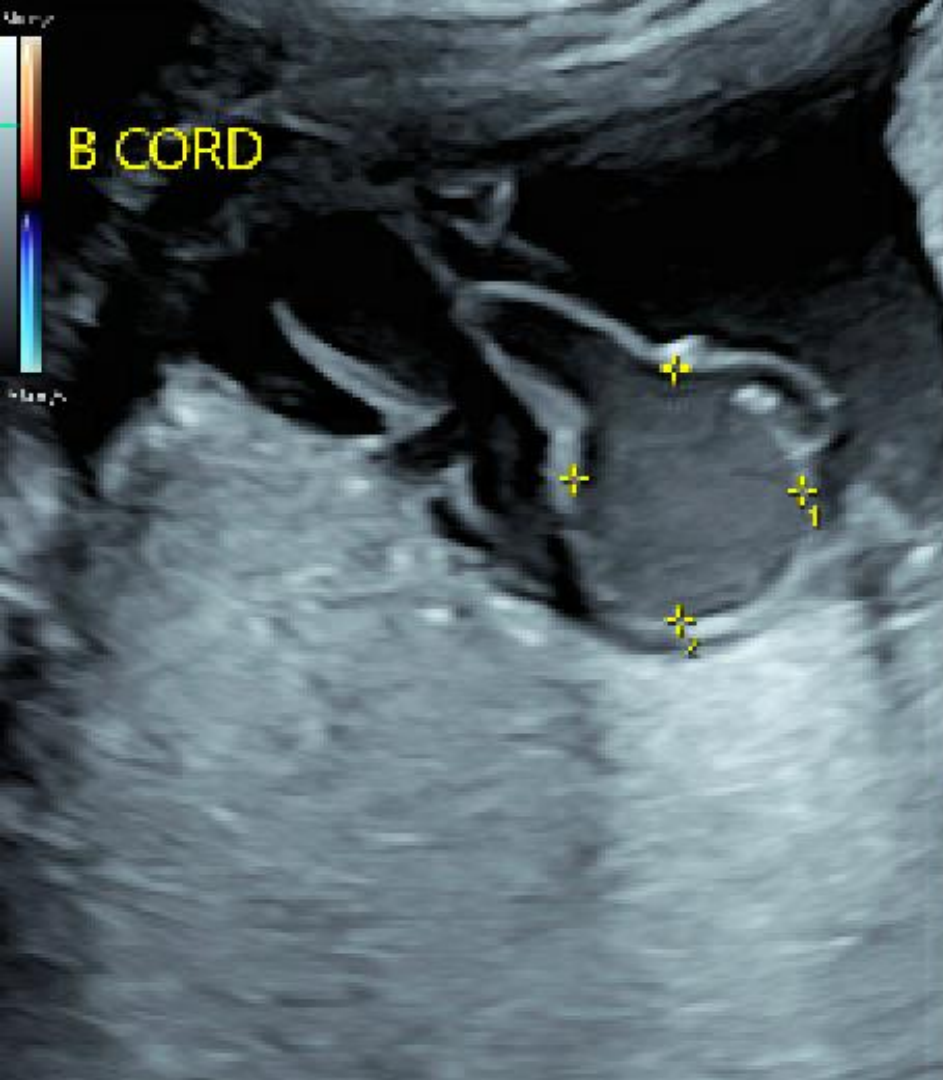


Vasa Previa: lines & bubbles

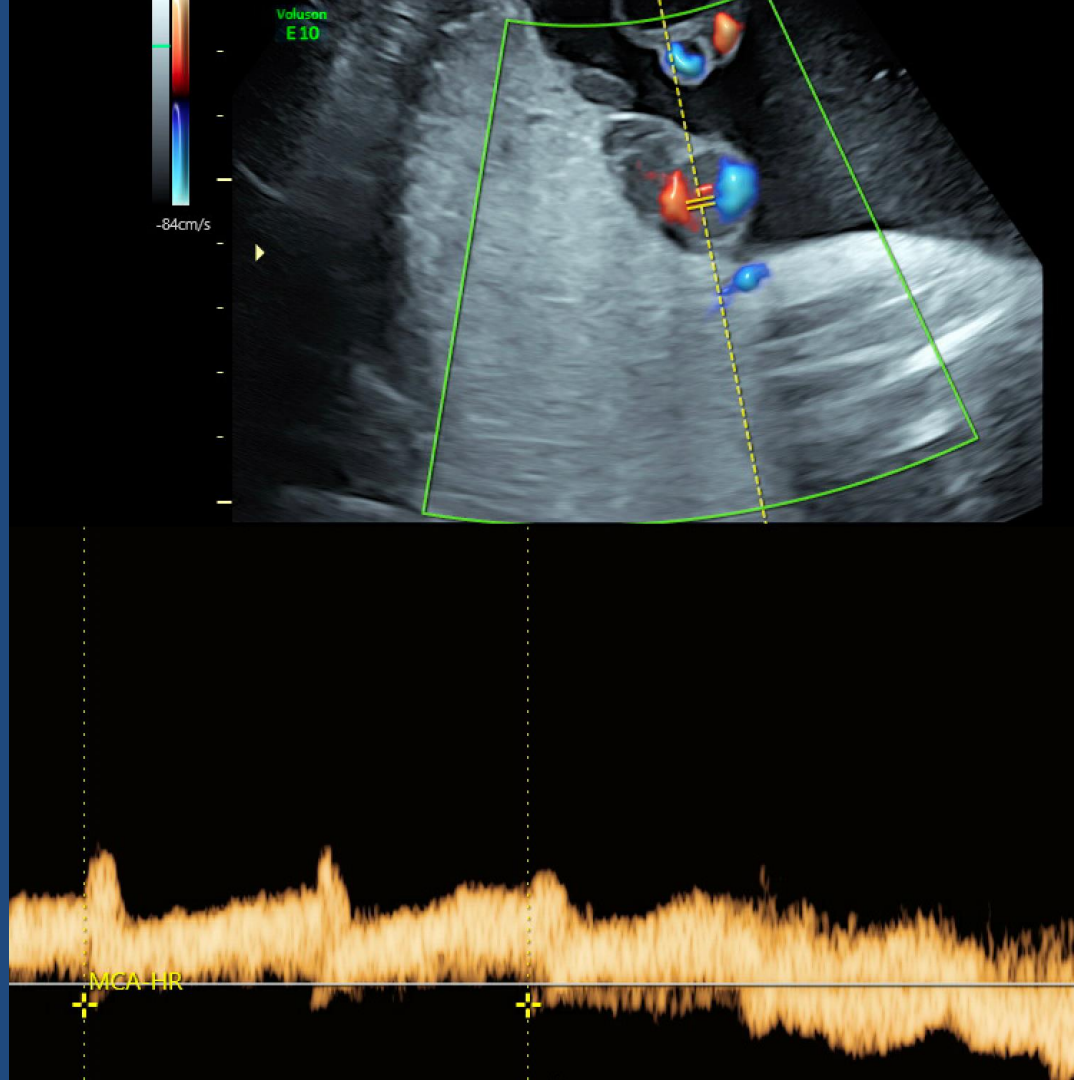


Vasa Previa: 3 types

- **Type I:** most common type, arising from a velamentous CI into a single-lobed placenta; vessels run free through the membranes over or near cx
- **Type II:** from a bilobed or succenturiate-lobed placenta with fetal vessels connecting the 2 placental lobes & traverse near the internal os
- **Type III:** abnormal fetal vessels coursing over the cervix without the classic features of type I or II. Vessels loop or boomerang through the membranes near the os & then return to the placenta



Arterial signal





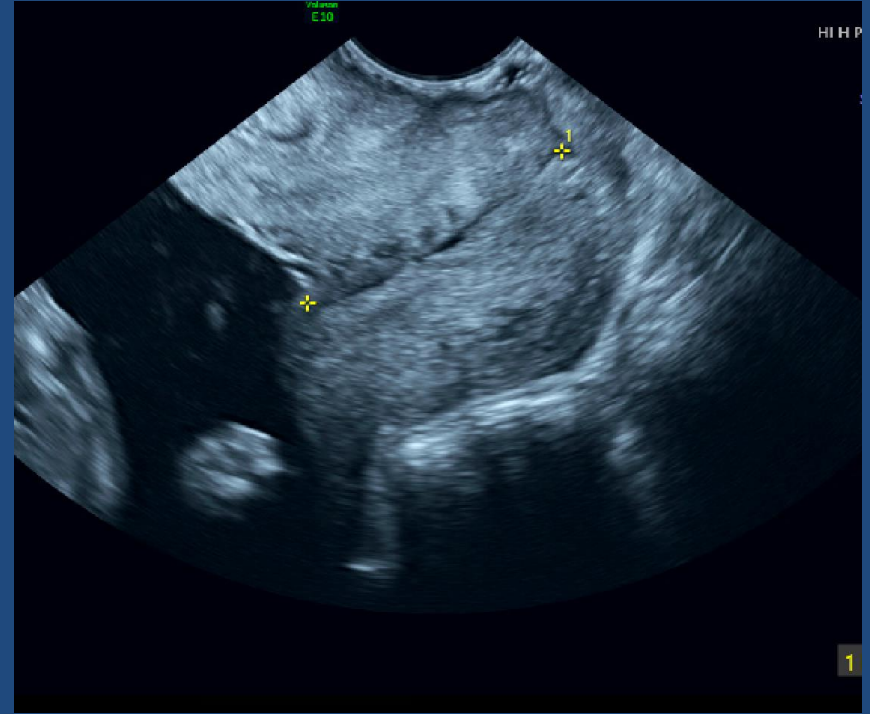
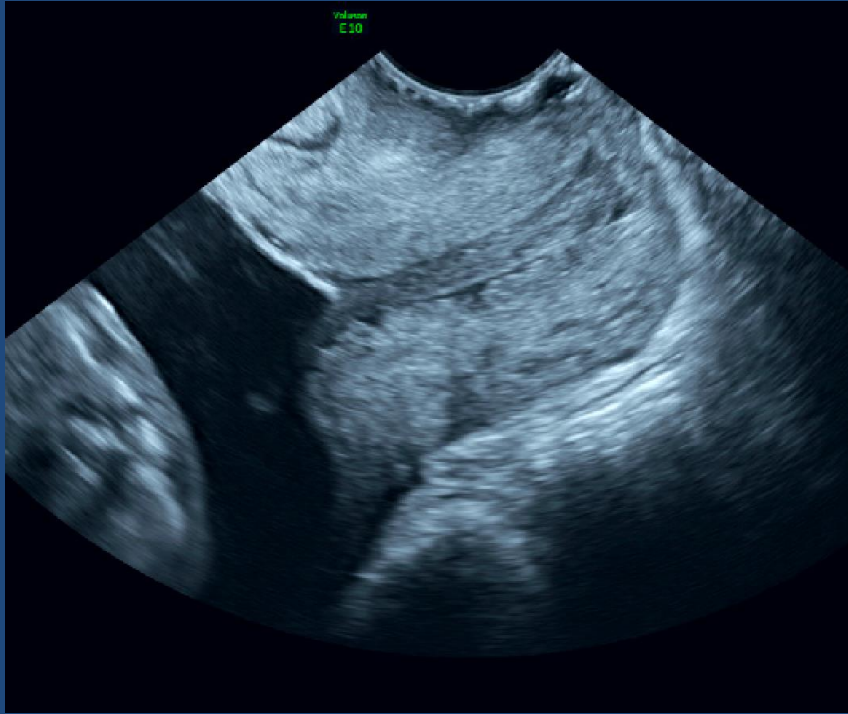


Non-obstetric causes of bleeding

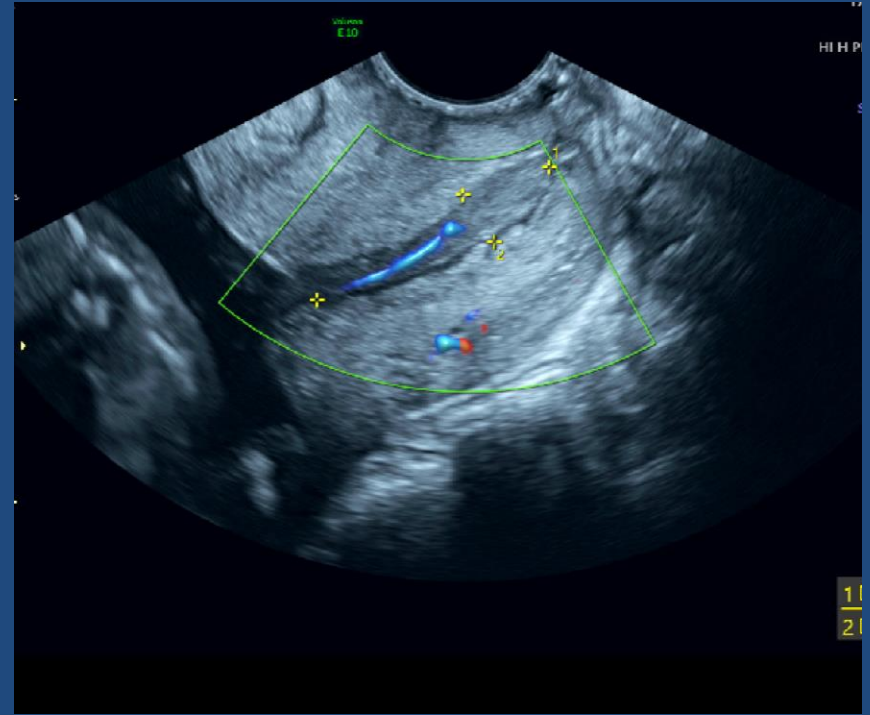
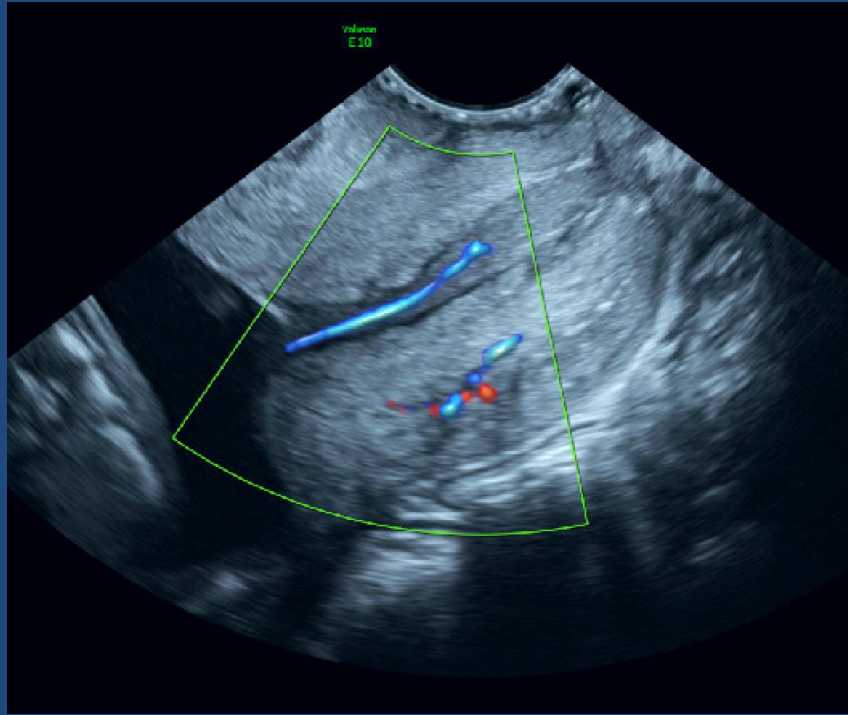
Bleeding in the Late Preterm Period: Non-Obstetric Etiologies

- Internal or external hemorrhoids
- Urinary tract infection
- Bladder or kidney stones
- Lower gastrointestinal bleeding
- Lower genital tract lesions
 - Vulvar varicosities
 - Large condylomata

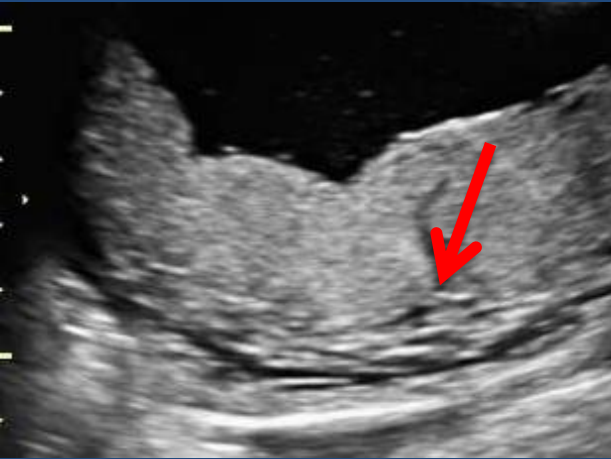
Cervical polyp



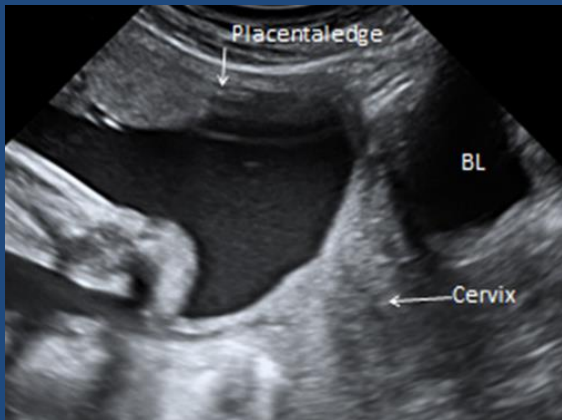
Cervical polyp w/feeding vessel



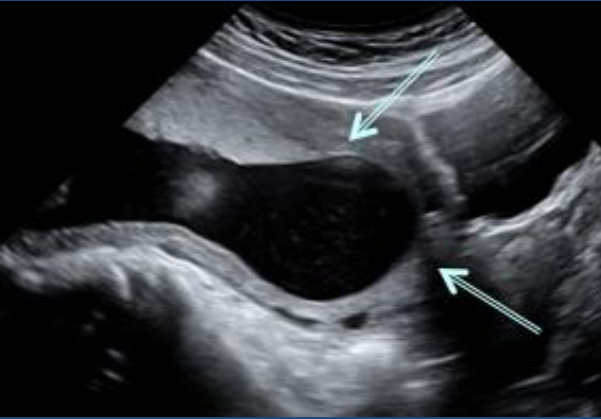
Approach to the Placenta



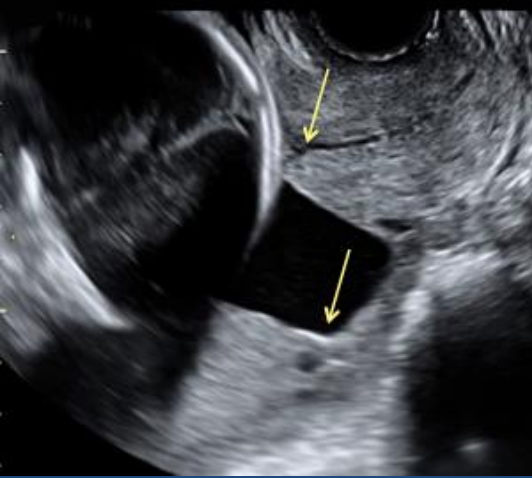
- A hypoechoic subplacental venous complex resides between the placenta & myometrium (*normal*)
- Placental location & relationship to internal os should be assessed on every scan
- TV ultrasound is used to assess placental edge to internal os if LUS is not well seen by TA imaging or if a low-lying placenta is suspected



Approach to the Placenta

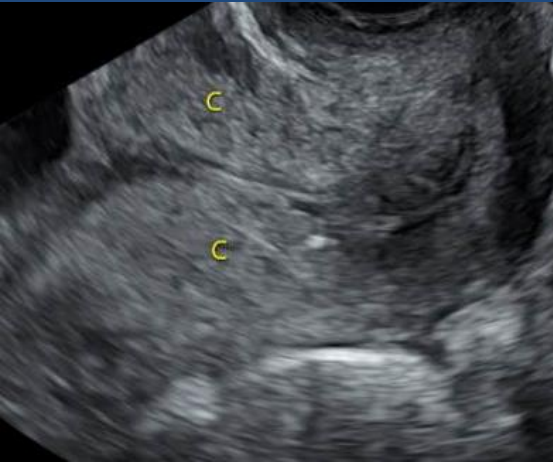


- Placenta is considered low-lying if inferior margin < 2 cm of internal os by TV scan
- Most low-lying placentas in 2nd trimester resolve by 3rd trimester
- Schedule follow up placental evaluation at 28 to 32 weeks to assess for resolution or persistence (*use color flow Doppler*)

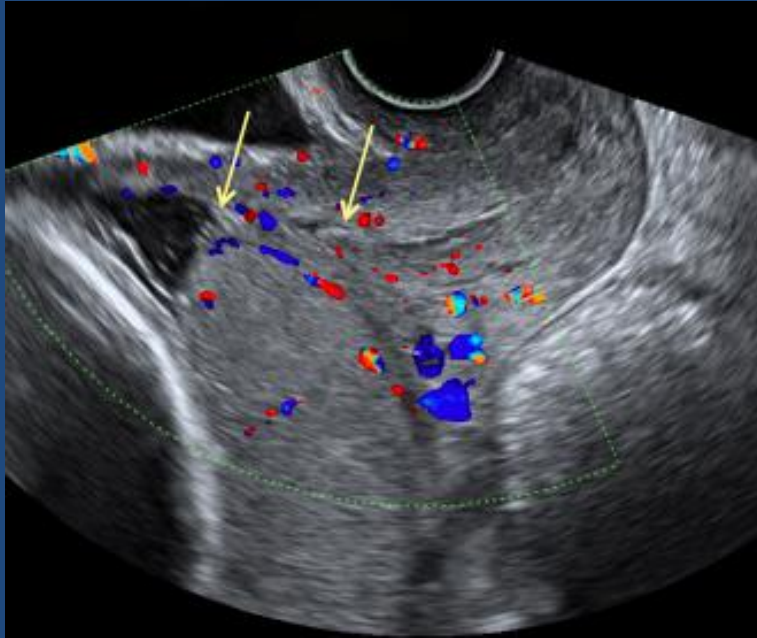


Approach to the Placenta

- Evaluate placenta with an empty bladder
- Focal uterine contractions may mimic a fibroid, abruption or previa
- If an anterior & posterior placenta are detected, scan in both longitudinal and axial planes to evaluate for a lateral placenta versus an accessory lobe



Keys to Diagnosis of Placenta Previa



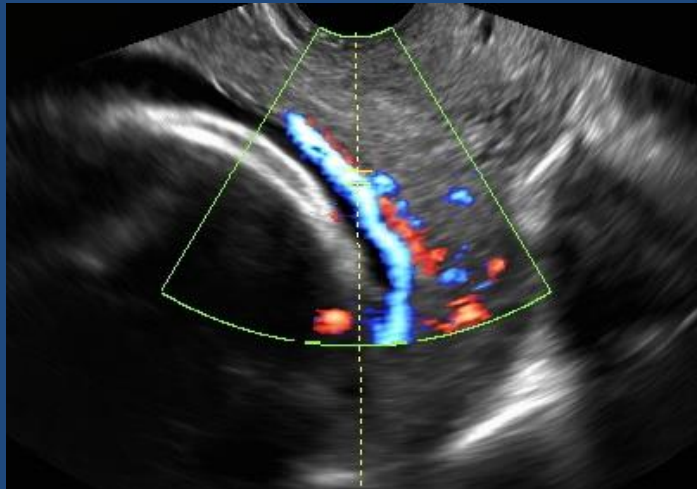
**Transvaginal sonography
+
Empty bladder**

Keys to Diagnosis of Placenta Abruptio



History
+
Clinical Presentation
+
US may fail to predict in
20-50% of cases

Keys to Diagnosis of Vasa Previa



- Suspect with:
 - Velamentous cord insertion
 - Resolved placenta previa
 - IVF
 - Known succincurate lobe
 - Turn on Doppler (color, pulsed-wave) if “lines or bubbles are detected”

Thank you,
Questions?

