

# UC San Diego

## Independent Study Projects

### Title

Tutorial : Ultrasound Diagnosis of Placenta Accreta.

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# Tutorial: Ultrasound Diagnosis of Placenta Accreta

Independent Study Project  
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Genetics

## Placenta Accreta:

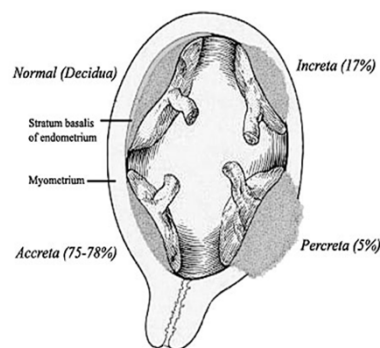
The clinical condition when part of the placenta, or the entire placenta, invades and is inseparable from the uterine wall

Accreta: Placental villi in direct contact with myometrium

Increta: Subtype extending into the myometrium but not to serosa

Percreta: Subtype extending to within one cell layer or beyond the serosa

Thought to be due to a defect in the decidua basalis, most commonly from prior uterine surgery



[http://en.wikipedia.org/wiki/File:Placenta\\_accreta.png](http://en.wikipedia.org/wiki/File:Placenta_accreta.png)

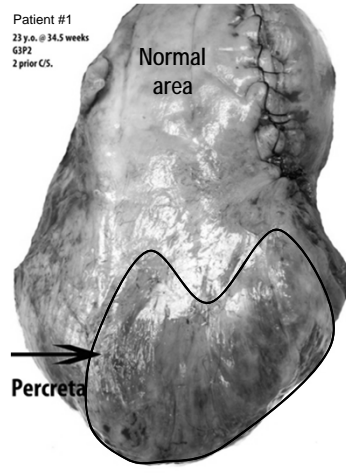
Complicated by massive hemorrhage  
unless managed with cesarean  
hysterectomy

Definition from: ACOG Committee on Obstetric Practice. ACOG Committee opinion. Number 266, January 2002: placenta accreta. Obstet Gynecol 2002;99(1):16

# Risk Factors

- Prior uterine surgery or instrumentation
  - Cesarean section, myomectomy, D & C
- Placenta previa
- Advanced maternal age
- Grand multiparity
- Conception by in vitro fertilization

*Any of these risk factors should prompt a sonographic search for accreta*



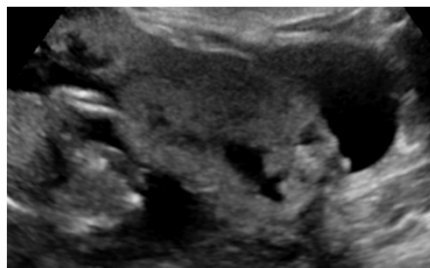
ACOG Committee on Obstetric Practice. ACOG Committee opinion. Number 266. January 2002: placenta accreta. Obstet Gynecol 2002;99(1):16  
 Fitzpatrick et al. Incidence and risk factors for placenta accreta/increta/percreta in the UK: a national case-control study. PLoS One. 2012;7(12):e

# Diagnosis: Ultrasound

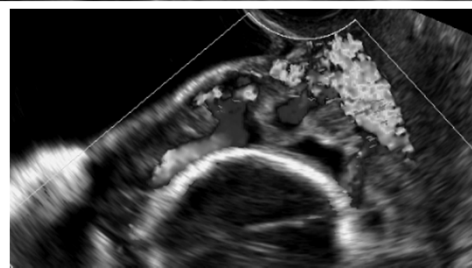
Diagnosis is typically by ultrasound in the 2<sup>nd</sup> or 3<sup>rd</sup> trimester, but may also be possible in the first trimester

TA = Transabdominal ultrasound  
 TV = Transvaginal ultrasound

#2, 12w4d TA, Percreta



#3, 18w5d TA, Percreta



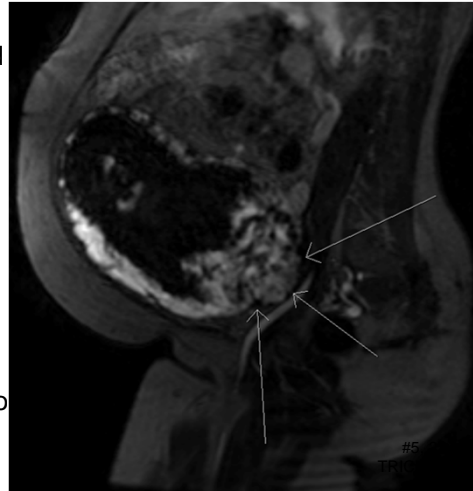
#4, 19w4d TV, Increta

## Diagnosis: MRI

In the case of ambiguous ultrasound findings, MRI may be a helpful adjunct

### Findings on MRI

- Uterine bulging (mass effect)
- Heterogeneous placenta
- Placental bands
- Obliteration of normal tissue planes (invasion of placenta into adjacent structures)



Dwyer et al. "Placenta Accreta: Spectrum of US and MRI Findings." Radiographics 2008; 28(7): 1905-1917.

## Goals for this module

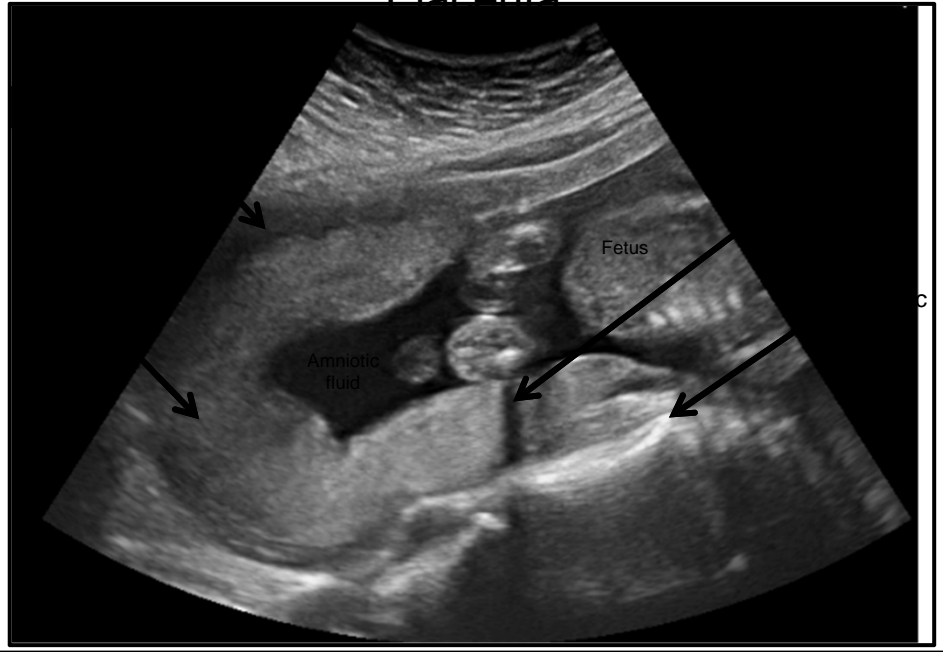
- Unfortunately, the diagnosis of placenta accreta can be easily missed, even by experienced imagers
- This tutorial is intended to educate medical providers on the sonographic appearance of placenta accreta, with attention to criteria for an adequate study and common pitfalls

## Module Overview

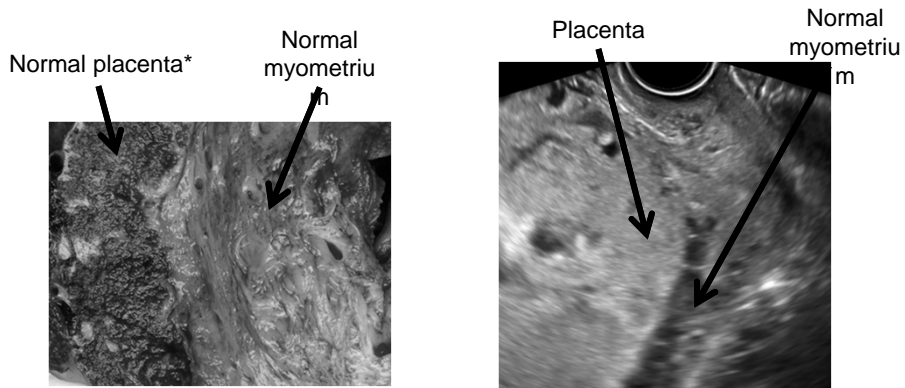
- Normal images
  - Fundal placenta
  - Gross pathology correlate
  - Posterior placenta
  - Placenta previa (detailed)
- Sample images by finding
  - Low Implantation
  - Placental Lakes
  - Myometrial Thinning
  - Interrupted Serosa
  - Color Doppler
- Pitfalls Quiz

What is normal?

### Normal Placental Anatomy with Fundal Placenta



### Gross Pathology Correlate

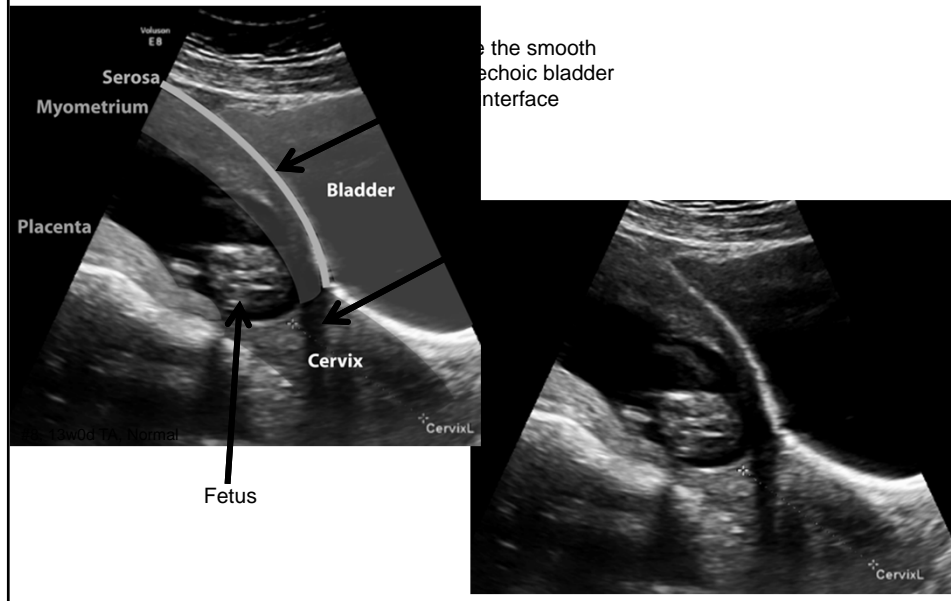


\*This patient had a focal percreta – a normal area is shown Path & TVUS images from patient #7 at 35w0d, Percreta

Myometrium is hypoechoic compared to placenta because it is less dense, with numerous larger vessels

Sonographic appearance of myometrium varies from entirely echolucent to shades of gray - it is always less echogenic than the placenta

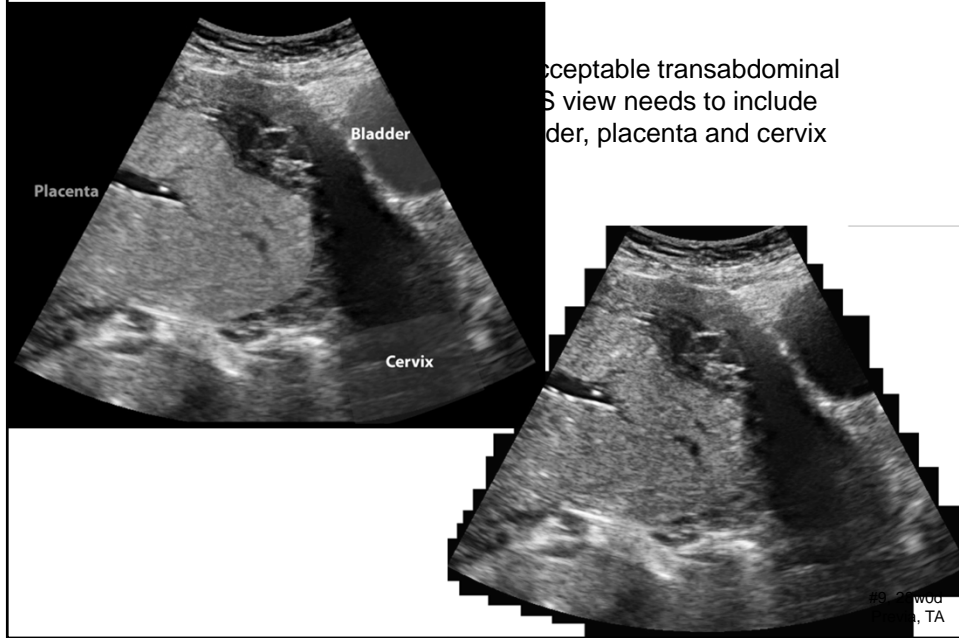
## Normal Lower Uterine Segment with Posterior Placenta



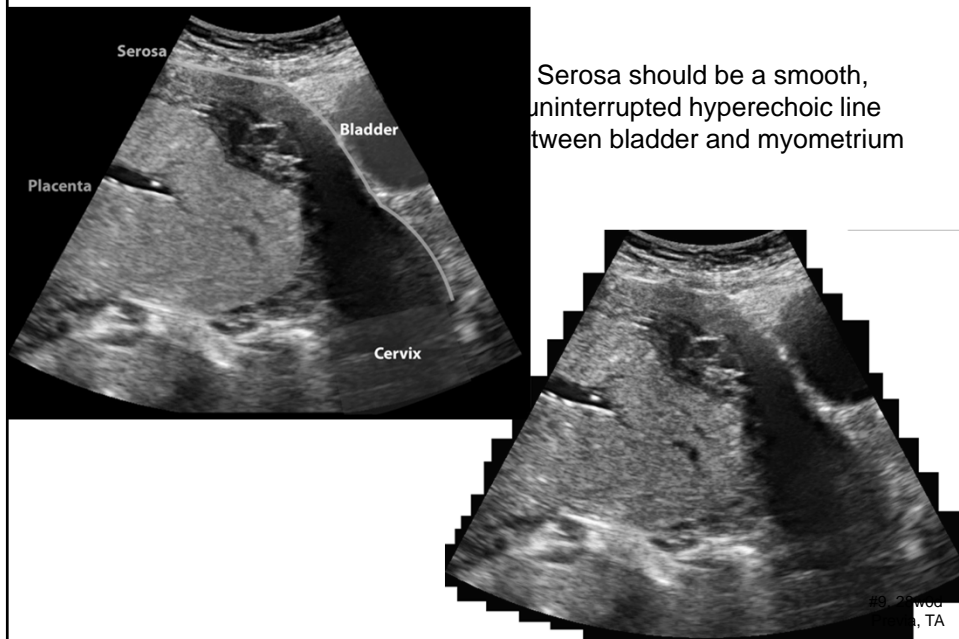
## Placenta Previa without Accreta

*The vast majority of  
accretas occur in the  
setting of placenta previa*

### Previa: Lower Uterine Segment

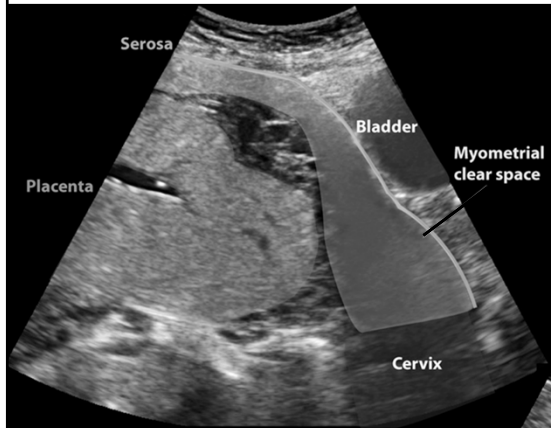


### Previa: Lower Uterine Segment





## Previa: Lower Uterine Segment



There should be a hypoechoic region between retroplacental vessels and serosa - the myometrial "clear space"

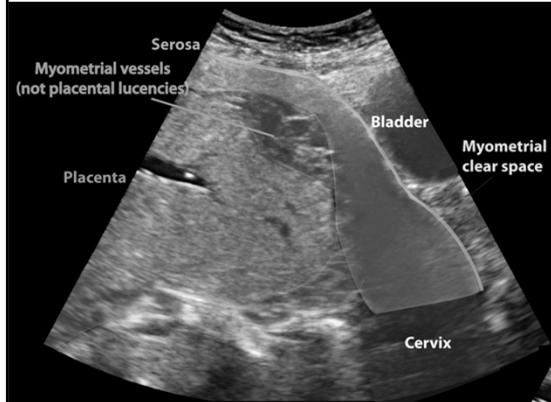


A clear space measuring less than 1 mm has been shown to be predictive of accreta

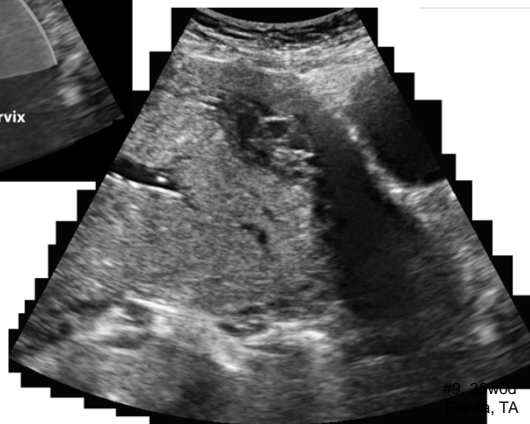
Twickler DM, Lucas MJ, Balis AB, Santos-Ramos R, Martin L, Malone S, Rogers B. Color flow Doppler ultrasound for myometrial invasion in women with a prior cesarean delivery. J Matern Fetal Med 2000; 9: 330-333

w0d  
TA

## Previa: Lower Uterine Segment

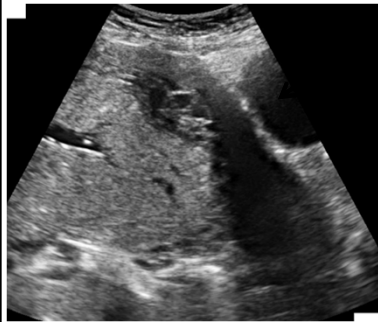


Myometrial vessels should not be mistaken for placental lucencies.



w0d  
TA

## Previa: Lower Uterine Segment



#9, 28w0d TA, Previa



#9, 28w0d TV, Previa



### PITFALL

Placenta accreta should not be ruled out without visualization of the bladder interface in two views; disruption of the serosa is most commonly seen at the bladder interface, and can be tricky to recognize

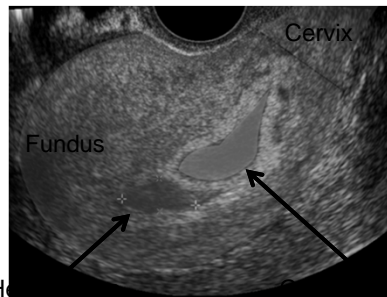
## Signs of Accreta on Ultrasound

1. Low implantation in 1<sup>st</sup> trimester
2. Placental lakes
3. Myometrial thinning
4. Irregular placental interface
5. Abnormal color doppler

# 1. *Low Implantation*

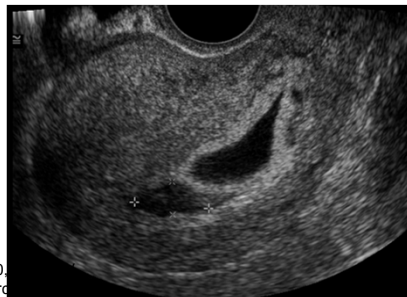
Even in the early 1<sup>st</sup> trimester, accreta is suggested by low implantation of the gestational sac

## 1. Early low implantation

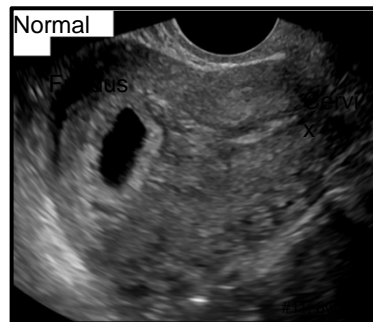


Implantation should be near the fundus – a gestational sac closer to the cervix should raise concern for placenta accreta

*Note that an adequate image requires visualization of the sac, fundus and cervix*



#10  
Perc



## 2. Placental Lakes

As the first thing to catch your eye, placental lakes should remind you to ask the patient about risk factors (*i.e.* surgical procedures), and prompt a search for less obvious signs

## 2. Placental Lakes



#14, 20w3d TA, Accreta



Numerous lakes, known as placental lucencies, give a "moth eaten" appearance

Normal placentas have a homogenous echotexture – though they may have a small number of less prominent lakes, particularly in the third trimester



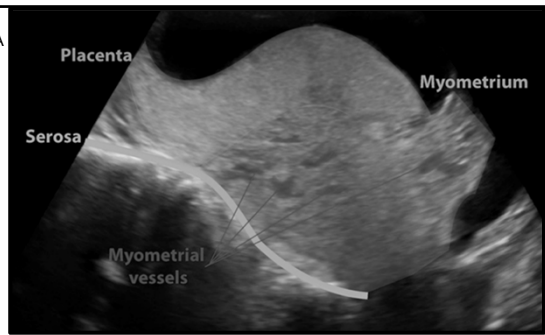
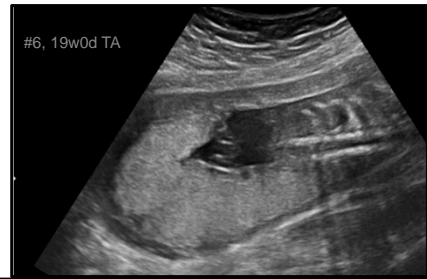
#6, 19w0d TA

## 2. Placental Lakes



Lakes may be seen as early as the first trimester

The images above are from the same placenta – at left in the 1<sup>st</sup> trimester, and at right in the 3<sup>rd</sup> trimester



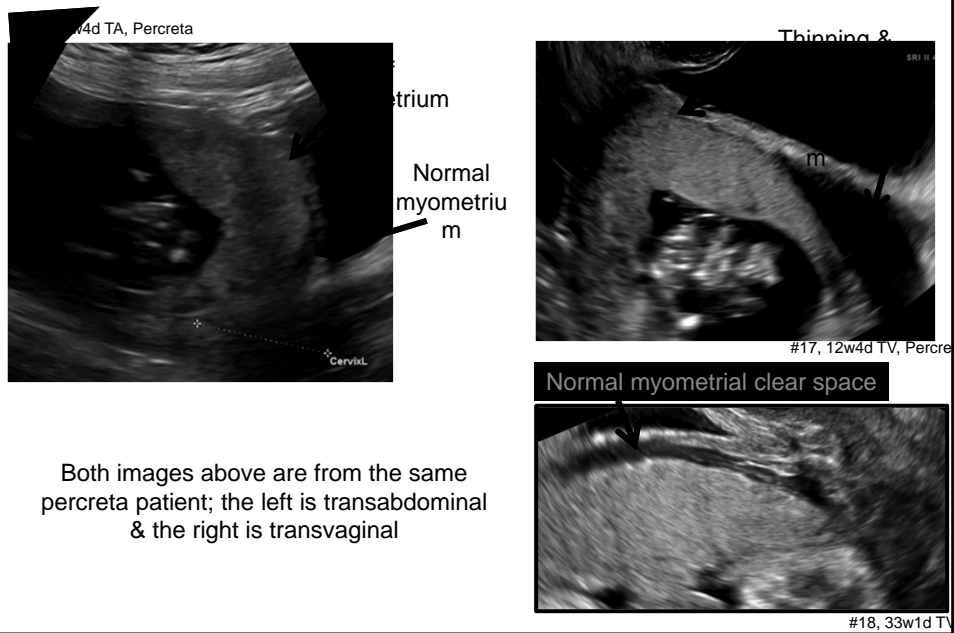
**X** PITFALL  
Note that myometrial vessels could be mistaken for placental lucencies



### 3. Myometrial Thinning

Myometrial thinning may be the only sign of an accreta in an initial scan but is frequently subtle; we suggest a low threshold for follow up

### 3. Myometrial Thinning



### 3. Myometrial Thinning



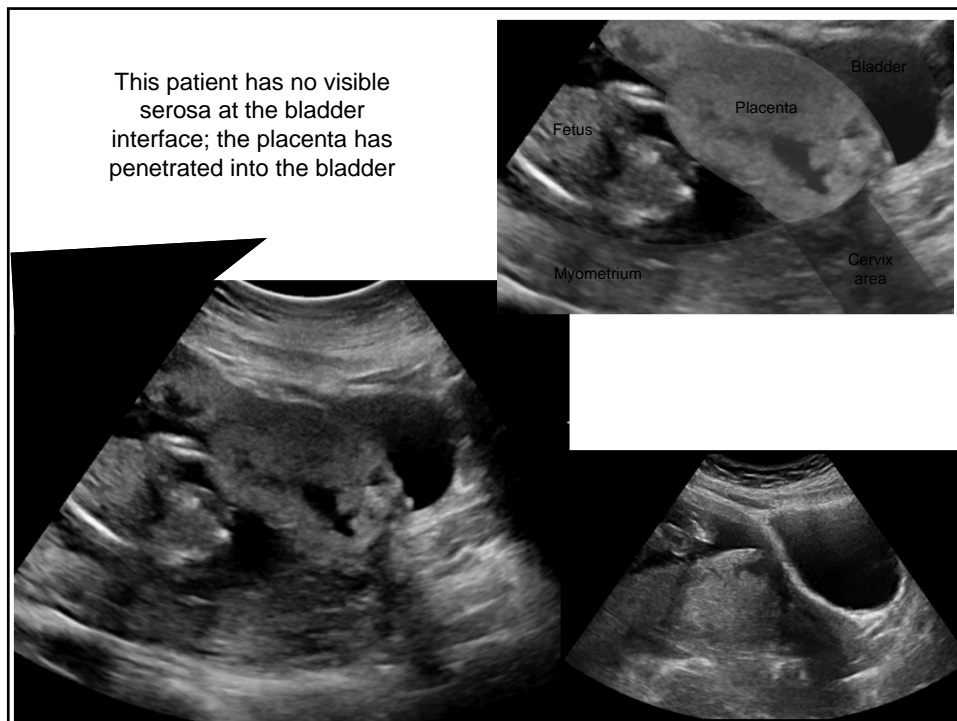
Another example of classic myometrial thinning, with transvaginal and transabdominal images from the same patient




### 4. *Interrupted Serosa*

Most commonly seen in the bladder view, but may be present anywhere along the placental interface

## 4. Interrupted Serosa



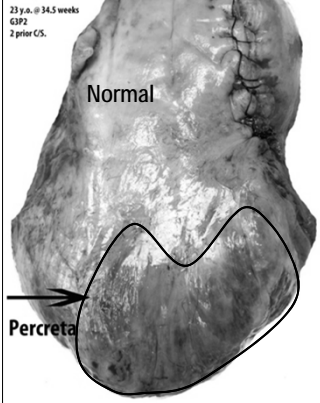




ive  
nta  
orly

These placentas are clearly  
invasive

Few accreta patients have this  
finding; interrupted bladder  
serosa is much more common

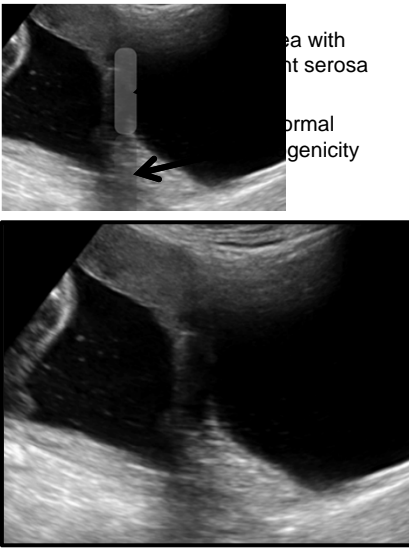


23 y.o. @ 34.5 weeks  
G3P2  
2 prior US.

Normal

Percreta

Path specimen corresponding to upper left  
image, after delivery seven weeks later



Area with  
nt serosa

normal  
genicity

**X** **PITFALL:** In the LUS view the bladder's  
curvature can produce refractive  
artifacts mimicking loss of serosa, as  
seen in the normal patient below

Area with  
shadowing  
due to artifact

Above is true loss of serosa, because  
the shadow does not travel beyond the  
bladder into the cervix area

## 5. Abnormal Color Doppler

Look for an internal comparison – verify that there is a change from normal to accreta portions of the placenta, as normal can vary from patient to patient

### 5. Abnormal Color Doppler

#19, 19w1d TV, Percreta

#22, 31w2d TV, Accreta

Abnormal Normal

#19, 19w1d TV, Percreta

#23, 35w6d TA, Percreta

3D rendering with normal and abnormal aspects

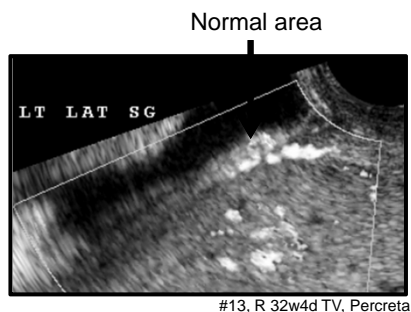
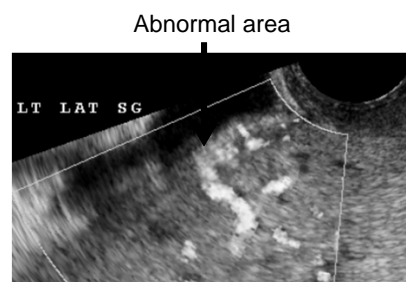
Chaotic flow with abnormal contour

Normal

#18, 33w1d TV

Color doppler is abnormal due to chaotic flow or the contour & direction of flow

✘ PITFALL: One normal image doesn't rule out accreta!



The images above are from the same scan - left shows abnormal flow (directed from the body of the placenta into the area of accreta), and right is normal (smooth contour and no markedly chaotic flow)

Using this internal comparison helps define normal for this patient, making the case for accreta more convincing

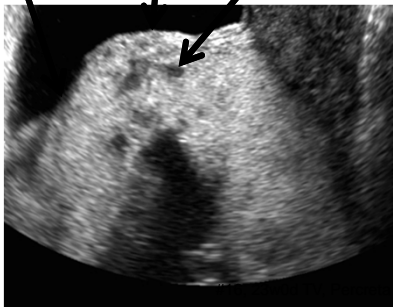
QUIZ

**Quiz** How do we know this is an accreta?  
Can you point out the findings?


Irregular interface, placenta bulging into bladder

Loss of serosa

Lakes




Flow with irregular contour, directed from inside placenta toward interface

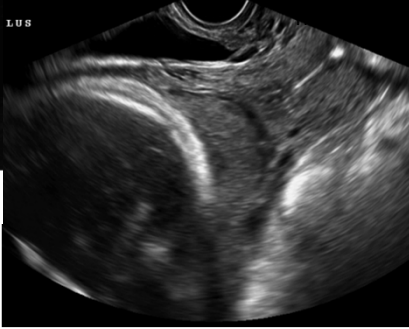


**Quiz** Is this an accreta?

#24\_34w5d



#25\_35w2d




This is an example of an inadequate image. Placenta accreta cannot be ruled out here because the bladder interface is not seen


At right is a better image; the bladder interface is visualized, allowing us to rule out accreta in this patient with previa

**Quiz** Both pregnancies are 8w5d  
Which is the accreta?

#26, 8w5d ACCRETA




#27, 8w5d NORMAL




**Quiz** Are these placental lucencies or normal myometrial vessels?  
How could we tell the difference?

#4, 19w4d TV



Answer: These are placental lucencies, but just the one image doesn't definitely tell you that.



This is tricky – the image on the left could be read as showing myometrial vessels, but when compared with the transverse view on the right it is more clearly part of the placenta, again demonstrating the need for multiple views

**Quiz** Why do we suspect accreta?

Hypoechoic myometrium

Thinning & loss of myometrium

Normal myometrium

#28, 29w4d TA, Increta

#28, 29w4d TV, Increta

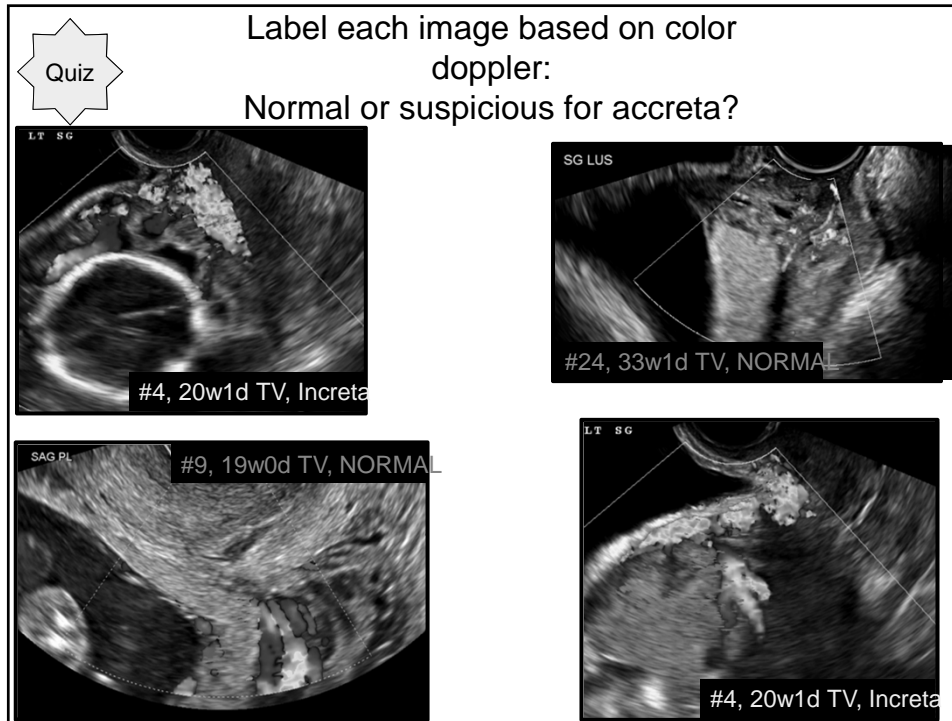
Normal

**Quiz** Is this interrupted bladder serosa?

We cannot say based on this image, as there is a refractile artifact obscuring the anterior interface of the bladder serosa.

CERVIX

A cleaner image shows that this percreta patient does have loss of serosa (she also has an irregular anterior interface)



## References

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- Baughman WC, Corteville JE, Shah RR. Placenta Accreta: Spectrum of US and MR Imaging Findings. *RadioGraphics* 2008; 28: 1905-1916.
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- Twickler DM, Lucas MJ, Balis AB, Santos-Ramos R, Martin L, Malone S, Rogers B. Color flow mapping for myometrial invasion in women with a prior cesarean delivery. *J Matern Fetal Med* 2000; 9: 330 – 335
- Wortman AC, Alexander JM. Placenta Accreta, Increta and Percreta. *Obstet Gynecol Clin N Am* 2013; 40: 137-154.