

# First Trimester Ultrasound: Chorions, Amnions and Embryos - Oh My!



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## TERMINOLOGY



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## FIRST TRIMESTER TERMINOLOGY

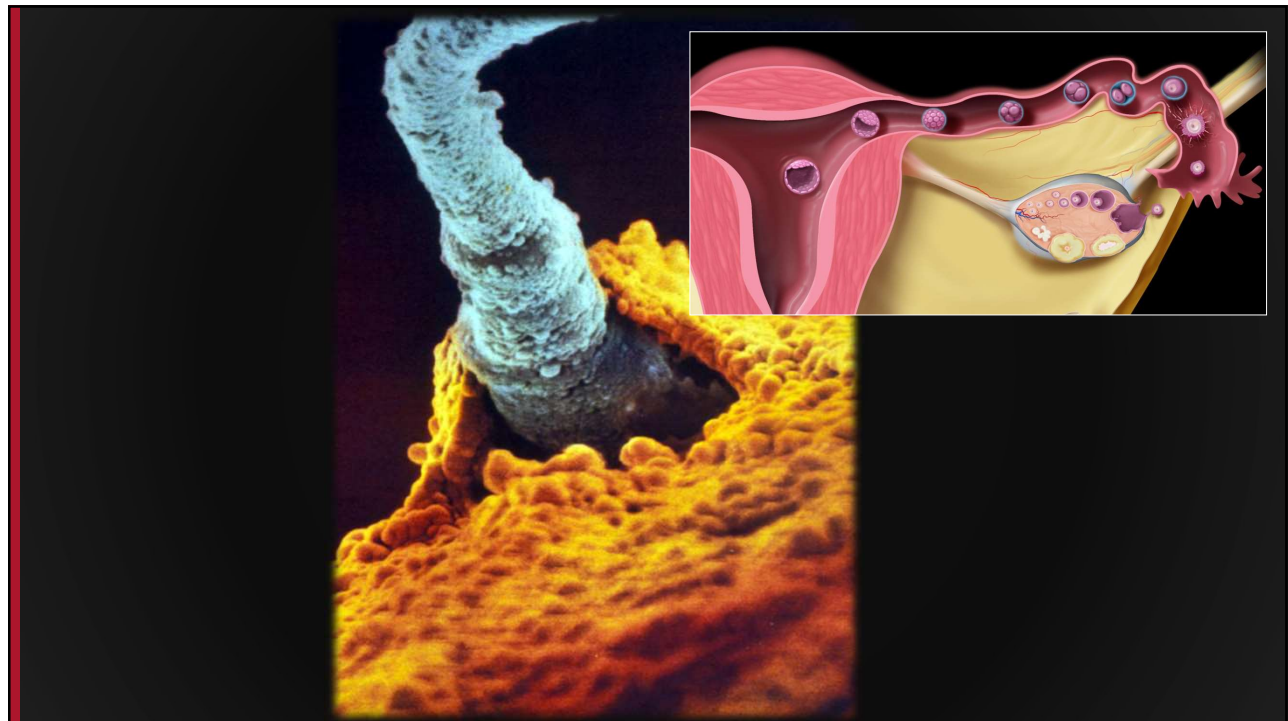
- **Definite intrauterine pregnancy:** Intrauterine gestational sac + YS or embryo, with or without cardiac activity
- **Probable intrauterine pregnancy:** Intrauterine sac-like structure
- **Pregnancy of unknown location:** NO signs of IUP or extrauterine pregnancy
- **Probable ectopic:** Inhomogeneous adherent mass or extrauterine sac like structure
- **Definite ectopic:** Extrauterine gestational sac + YS or embryo, with or without cardiac activity

Barnhart K, van Mello NM, Bourne T. Pregnancy of unknown location: a consensus statement of nomenclature, definitions and outcome. 2011. Fertil Steril. 95 (3) 857-863



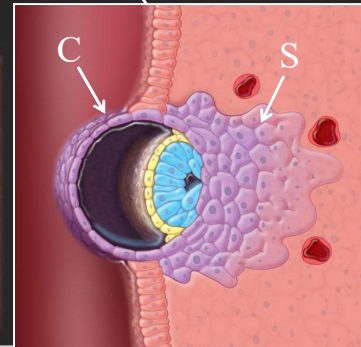
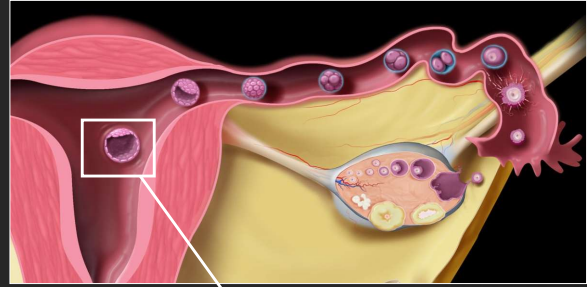
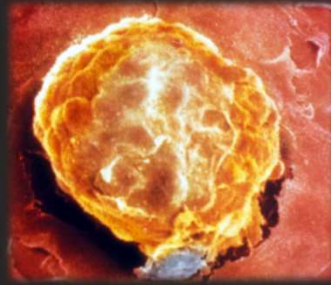
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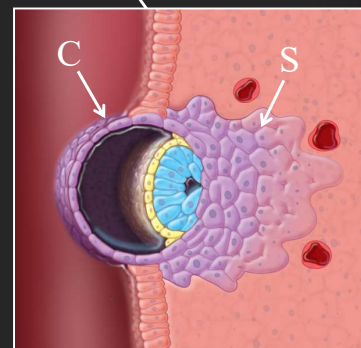
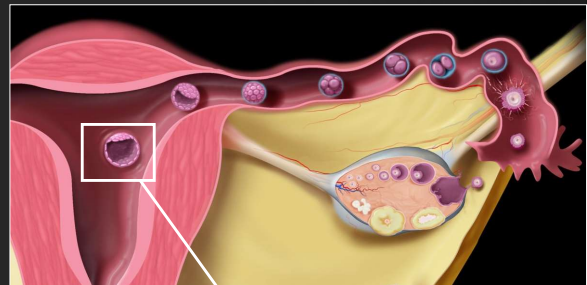
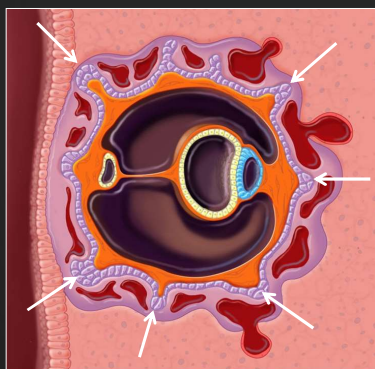
6

- Blastocyst
  - Embryoblast
    - Inner cell layer, becomes embryo
  - Trophoblast (from trophe, Greek for nourishment)
    - Outer cell layer, forms placenta
    - 2 cell types: cytotrophoblast, syncytiotrophoblast



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Chorionic villi develop from cytotrophoblast forming primitive uteroplacental circulation

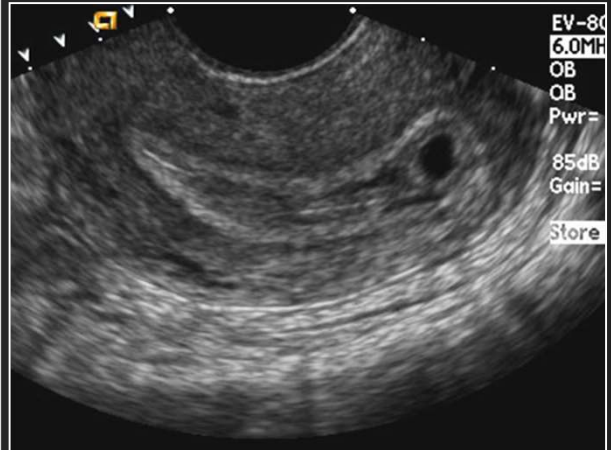
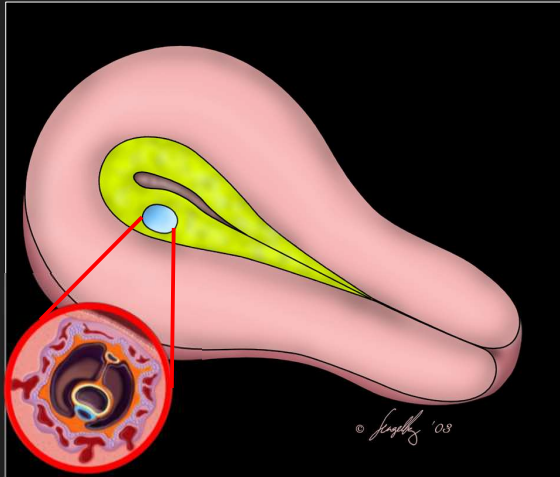


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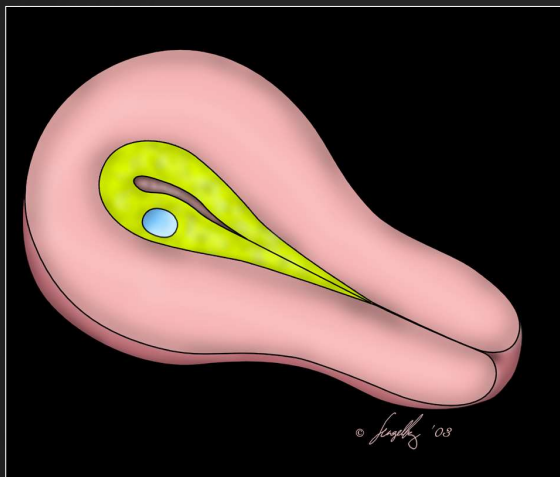
# Decidua is endometrium in pregnancy

## Intradecidual sac sign

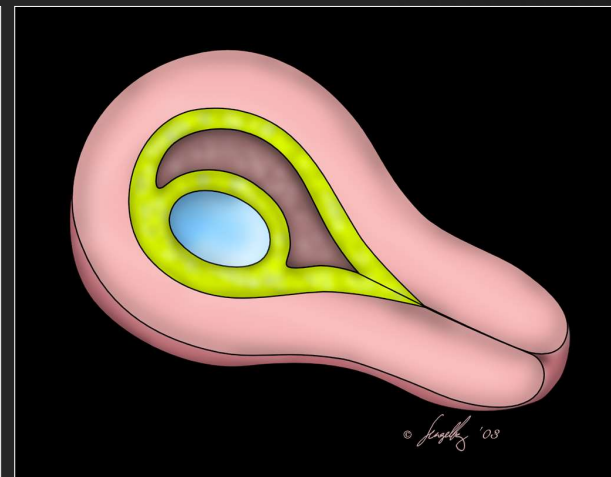


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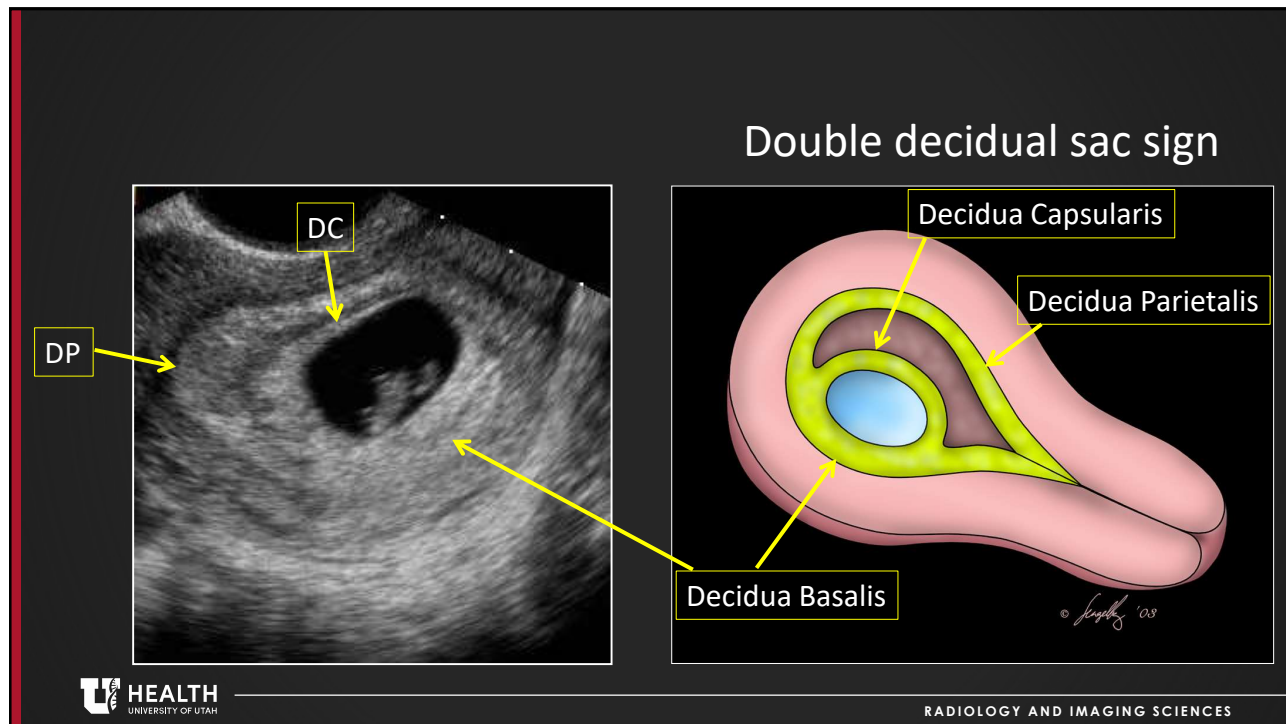
## Intradecidual sac sign



## Double decidual sac sign



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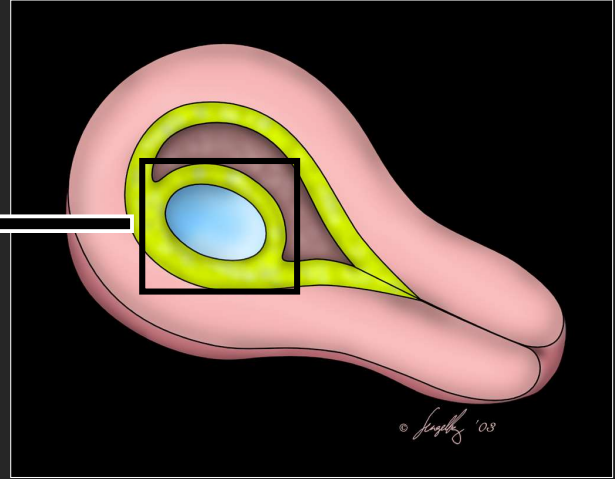
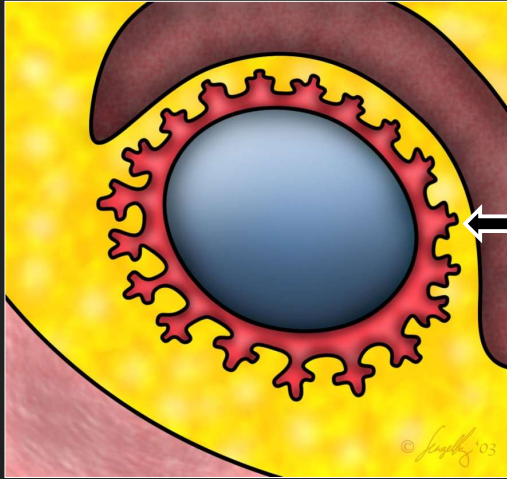
- IDSS and DDSS are considered subjective and not consistently present
- Probable intrauterine pregnancy

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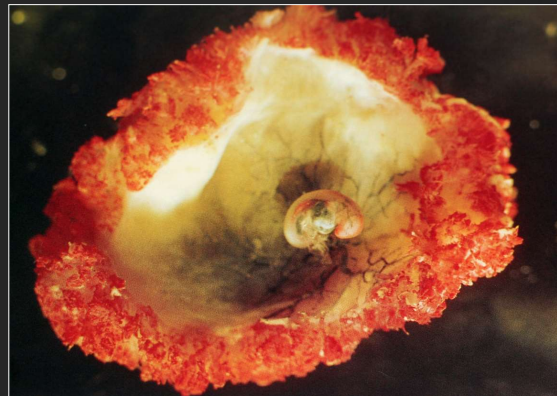
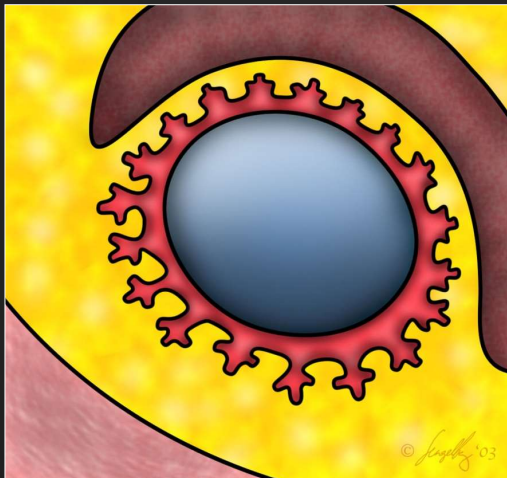
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Chorion is from embryonic trophoblast  
Chorionic sac = Gestational sac

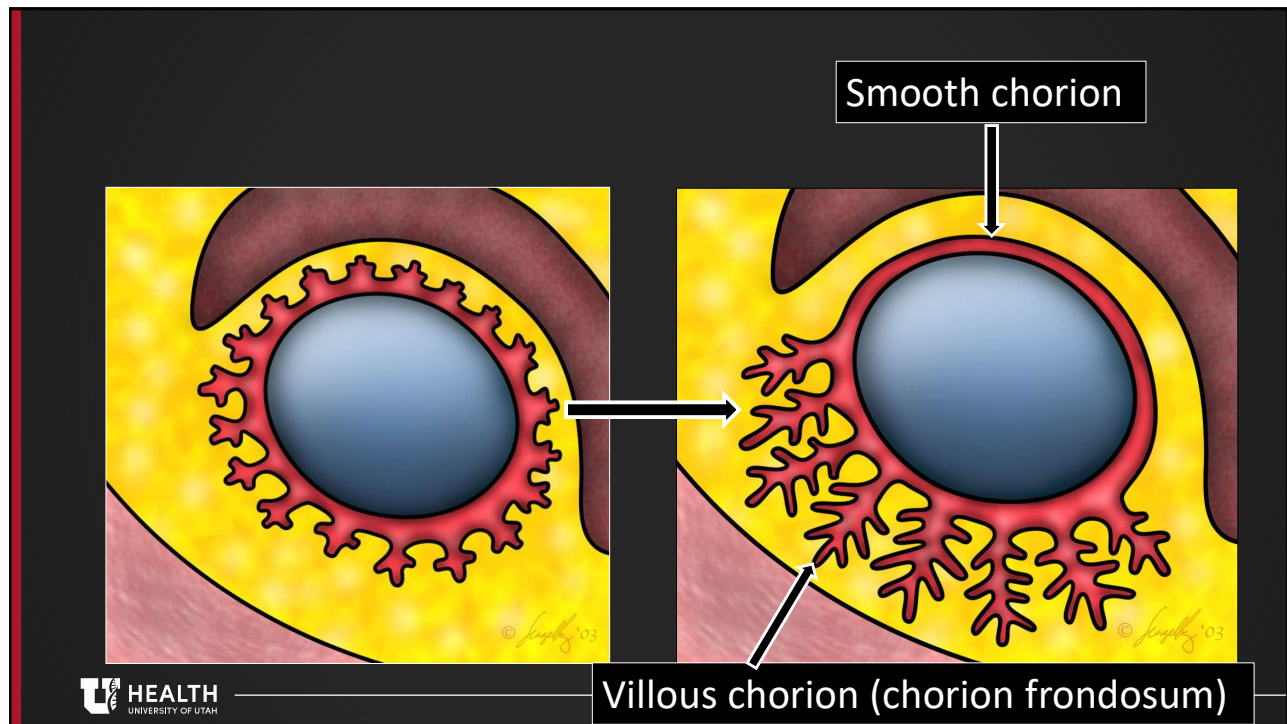


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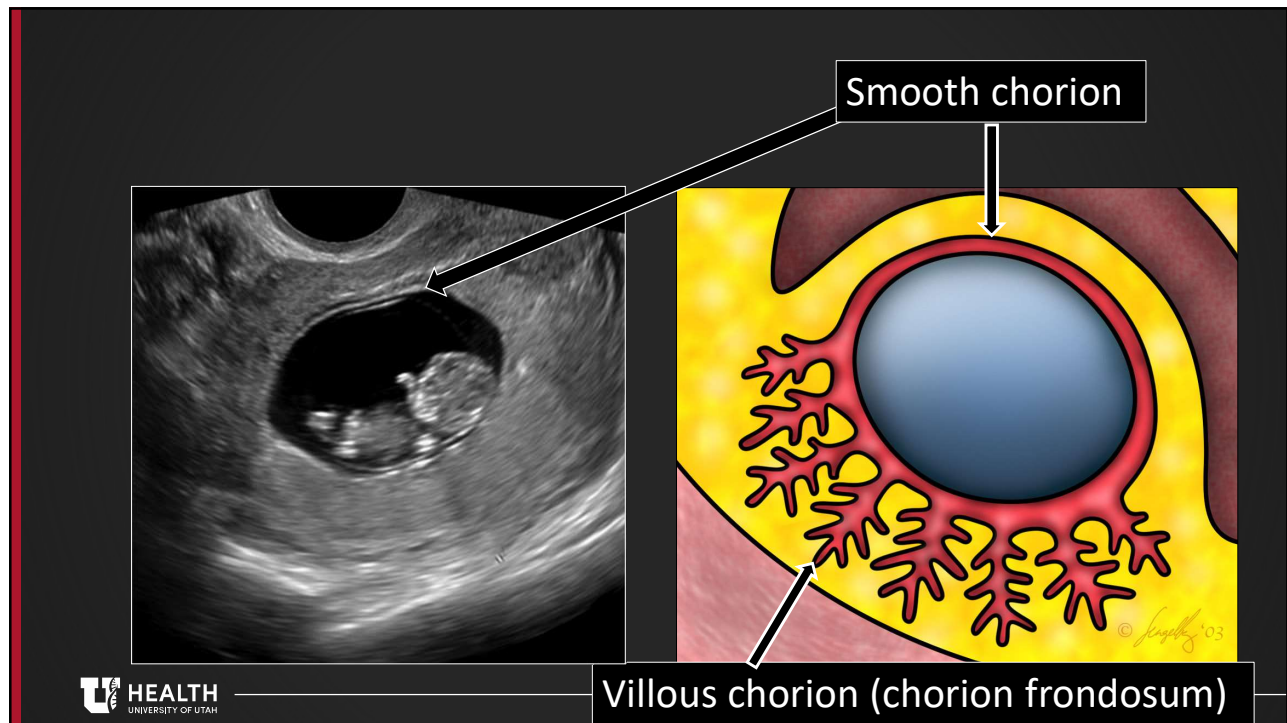
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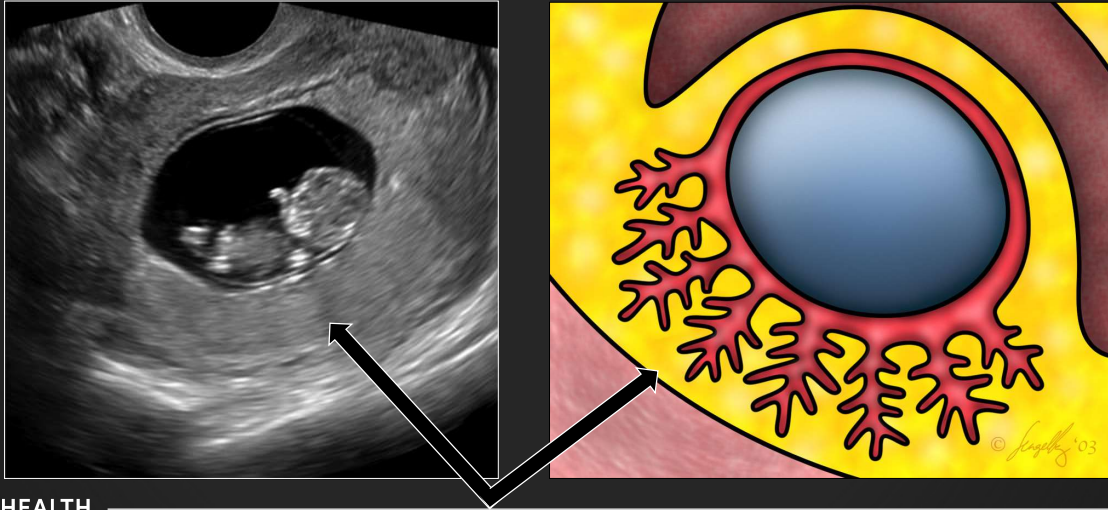
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Decidua basalis + Chorion frondosum =  
Placenta

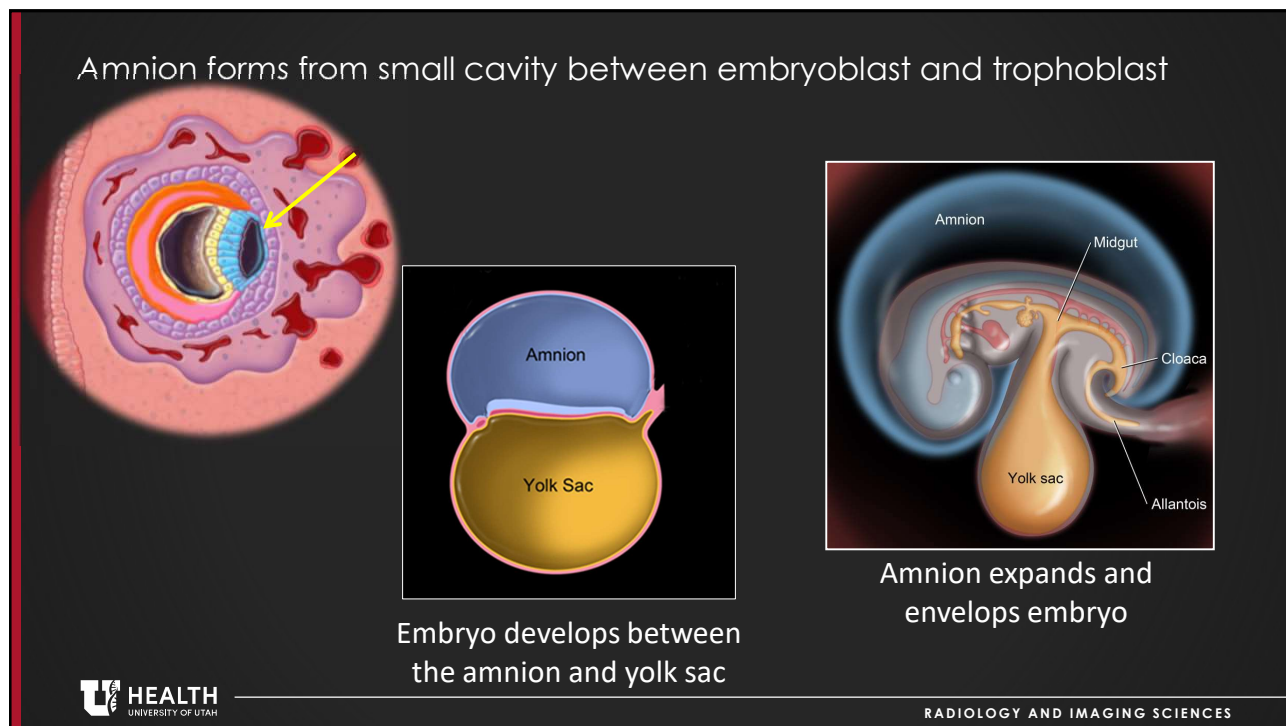


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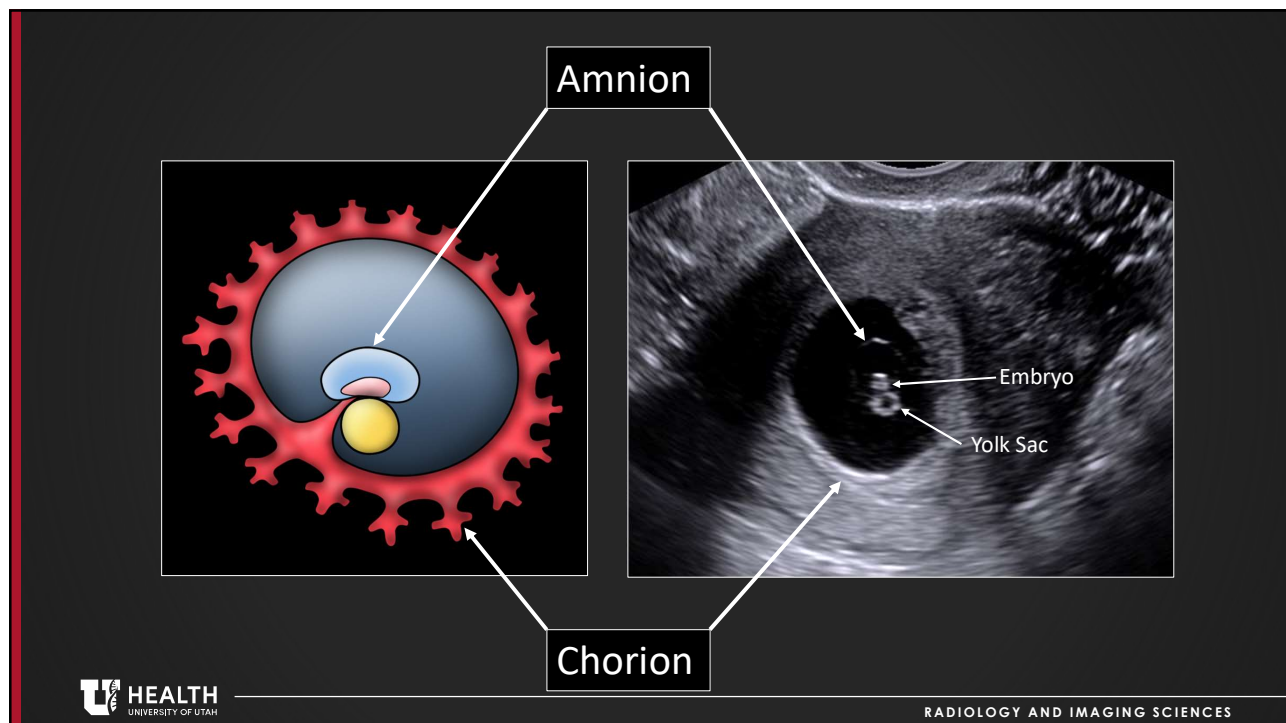
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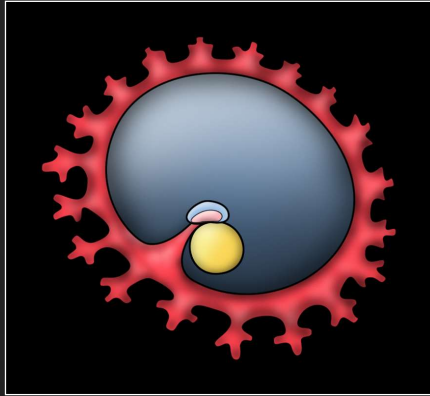
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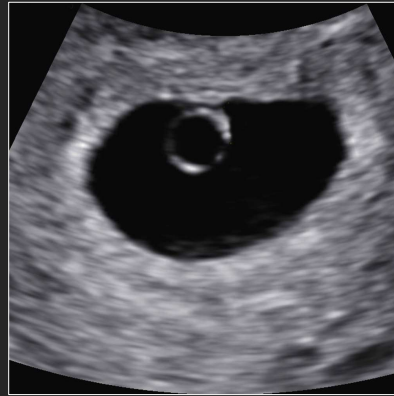
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## YOLK SAC

- Visualized at 5 – 5.5 weeks
- Normal YS  $\leq 6$  mm (most 3-5 mm)



**Definite intrauterine pregnancy!**

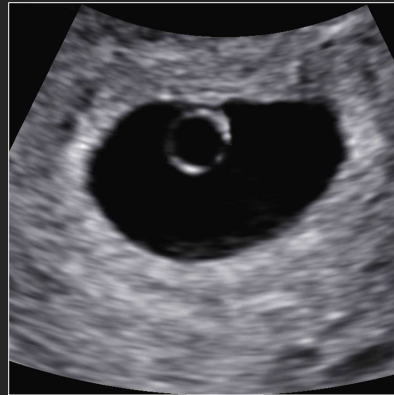


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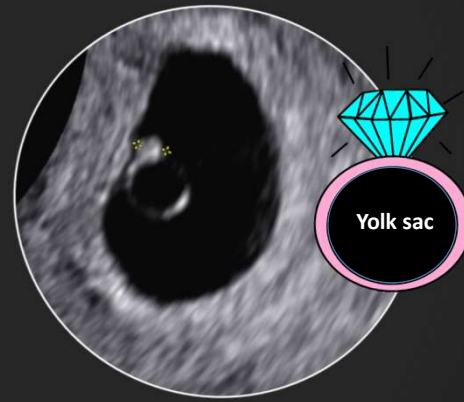
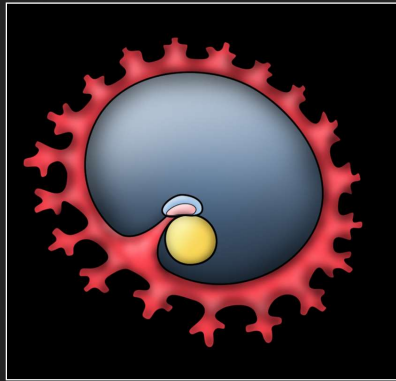
**Definite intrauterine pregnancy!**



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## EMBRYO

- Visualized 6 – 6.5 wks

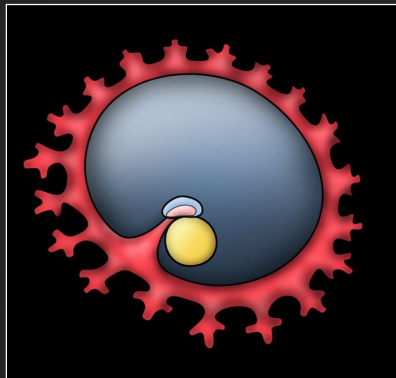


Diamond Ring Sign

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## EMBRYO

- Visualized 6 – 6.5 wks



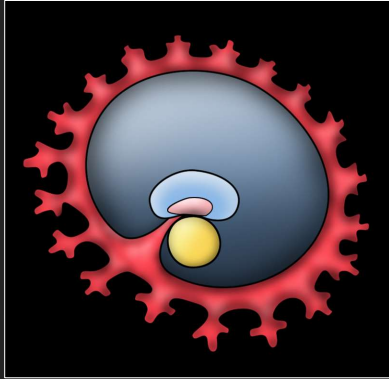
Diamond Ring Sign

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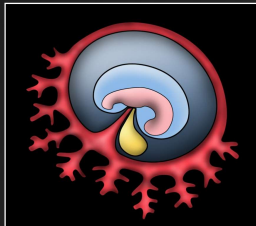
## EMBRYO

- Visualized 6 – 6.5 wks



Double Bleb Sign

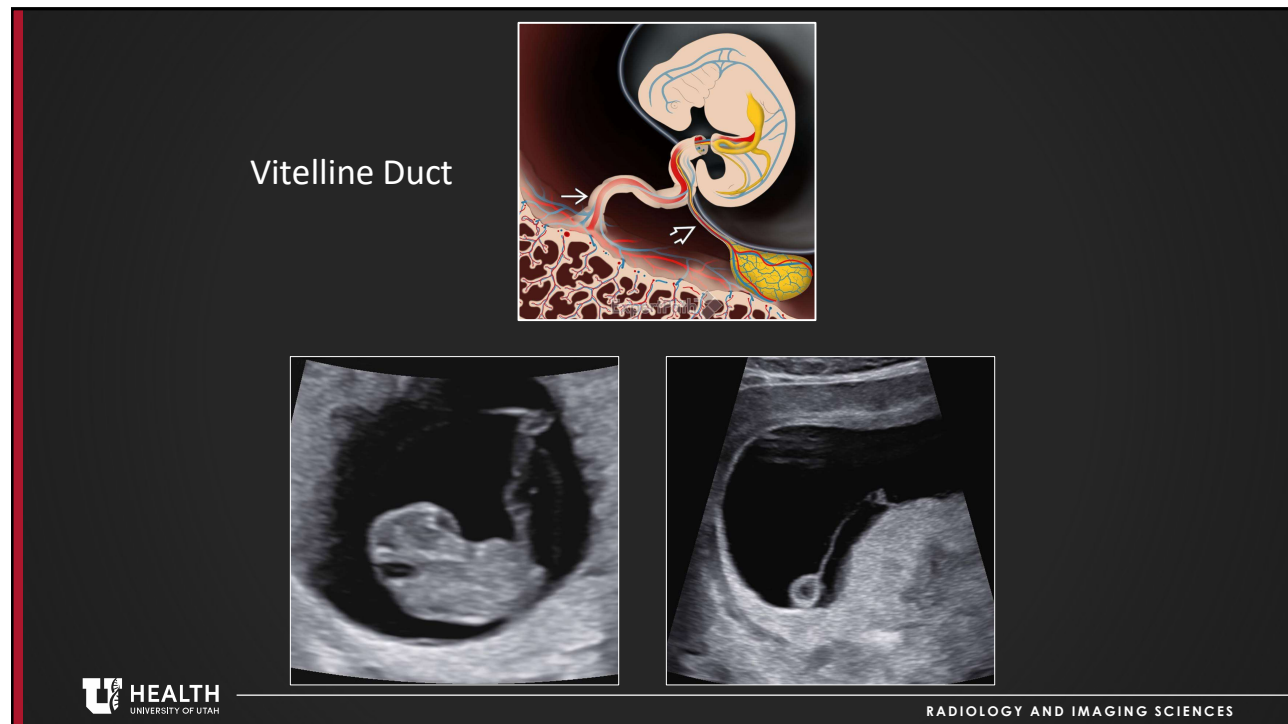
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7-10 WEEKS



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# GUIDELINES FOR ~~FAILED~~ PREGNANCY

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

**CURRENT CONCEPTS**  
Edward W. Campion, M.D., *Editor*

## Diagnostic Criteria for ~~Nonviable~~ Pregnancy Early in the First Trimester

Peter M. Doubilet, M.D., Ph.D., Carol B. Benson, M.D.,  
Tom Bourne, M.B., B.S., Ph.D., and Michael Blaivas, M.D., for the Society of  
Radiologists in Ultrasound Multispecialty Panel on Early First Trimester Diagnosis  
of Miscarriage and Exclusion of a Viable Intrauterine Pregnancy\*

Doubilet et al. Diagnostic criteria for nonviable pregnancy early in the first trimester.  
NEJM 2013;369:1443-1451

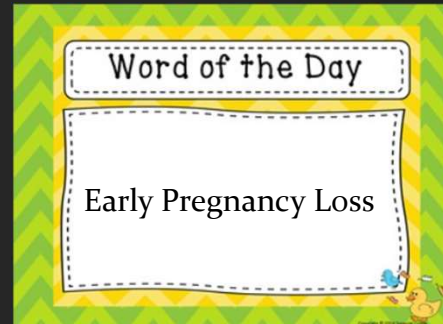
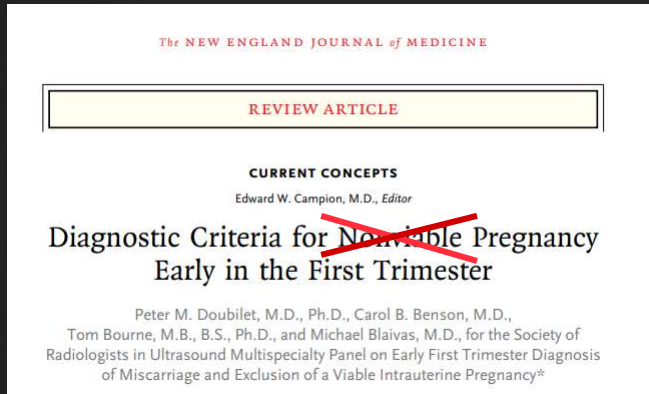
\*The other authors and members of the panel are Kurt T. Barnhart, M.D., M.S.C.E., Perelman School of Medicine at the University of Pennsylvania, Philadelphia; Beryl R. Benacerraf, M.D., Brigham and Women's Hospital and Harvard Medical School, Boston; Douglas L. Brown, M.D., Mayo Clinic, Rochester, MN; Roy A. Filly, M.D., University of California, San Francisco, San Francisco; J. Christian Fox, M.D., University of California, Irvine, Irvine; Steven R. Goldstein, M.D., New York University School of Medicine, New York; John L. Kendall, M.D., Denver Health Medical Center, Denver; Edward A. Lyons, M.D., Health Sciences Center, University of Manitoba, Winnipeg, MB, Canada; Misty Blanchette Porter, M.D., Geisel School of Medicine at Dartmouth, Hanover, NH; Dolores H. Pretorius, M.D., University of California, San Diego, San Diego; and Ilan E. Timor-Tritsch, M.D., New York University School of Medicine, New York.

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# GUIDELINES FOR ~~FAILED~~ PREGNANCY



Doubilet et al. Diagnostic criteria for nonviable pregnancy early in the first trimester.  
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## GUIDELINES FOR DEFINITE EARLY PREGNANCY LOSS

- Mean GSD  $\geq 25$  mm with no embryo
- Yolk sac no longer part of guidelines



Doubilet et al. Diagnostic criteria for nonviable pregnancy early in the first trimester.  
NEJM 2013;369:1443-1451

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## GUIDELINES FOR DEFINITE EARLY PREGNANCY LOSS

- Mean GSD  $\geq 25$  mm with no embryo
- All guidelines for diagnosis and follow-up are the most conservative and designed to never misdiagnose a ~~viable pregnancy as failed~~

normally developing

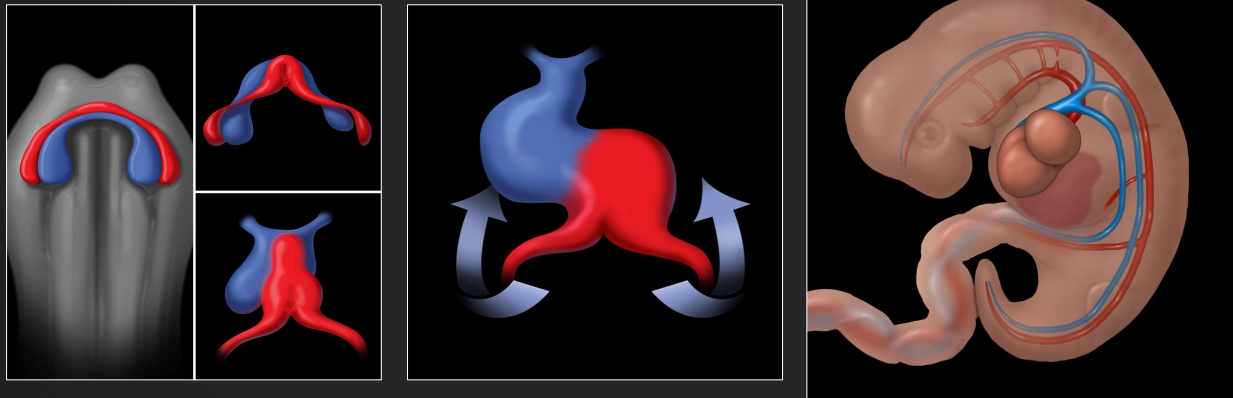
early pregnancy loss



Doubilet et al. Diagnostic criteria for nonviable pregnancy early in the first trimester.  
NEJM 2013;369:1443-1451

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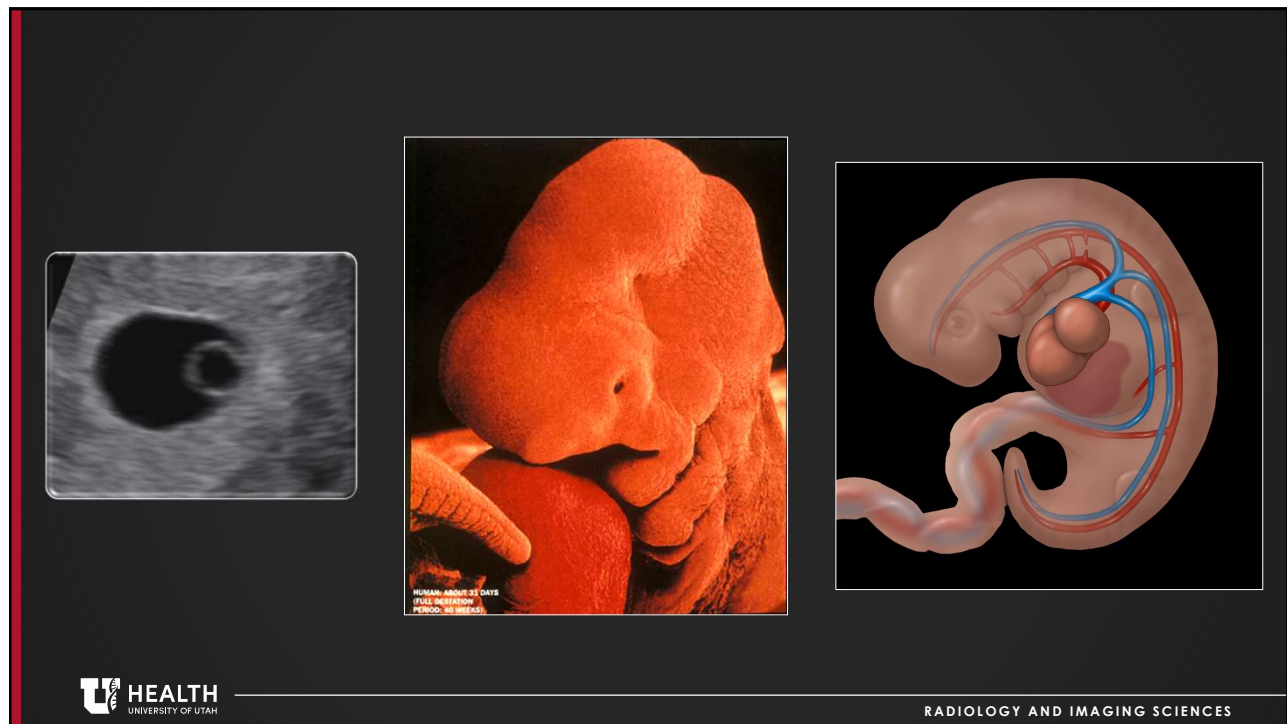
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Word Of The Day

Cardiac Activity

**AVOID**

- Heart motion
- Heart beat
- Heart rate
- Living
- Live
- Viable

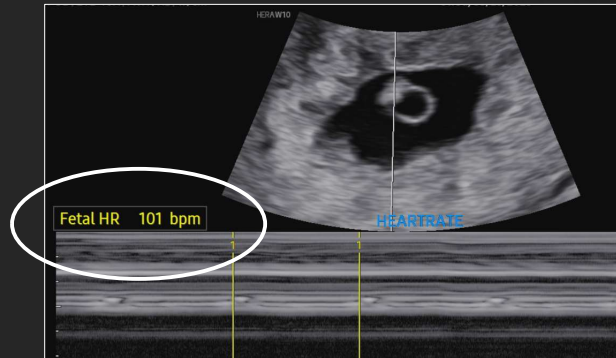
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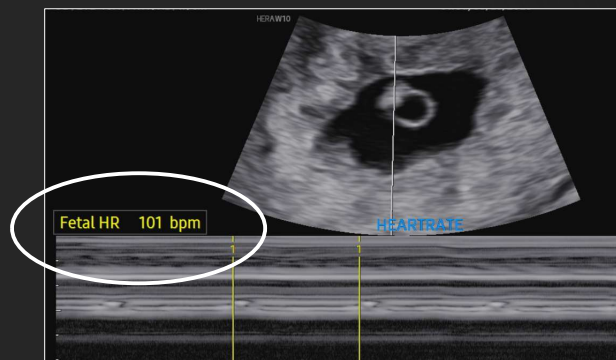
*It's not a fetus*

*It's not a heart*



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Heartbeat must be seen  
when  $CRL \geq 7$  mm



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## Pregnancy of Unknown Location (PUL) is a situation, not a diagnosis!

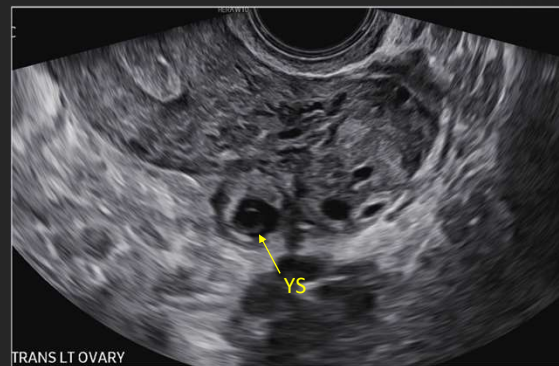


Requires further evaluation and follow-up

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## DEFINITE ECTOPIC PREGNANCY

- Extrauterine gestational sac + YS or embryo, with or without cardiac activity



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## PROBABLE ECTOPIC PREGNANCY

- Inhomogeneous adherent mass or extrauterine sac like structure
- Findings
  - Echogenic tubal ring
  - Nonspecific mass
  - "Ring of fire" in trophoblast with color Doppler
- Use your probe to separate from ovary

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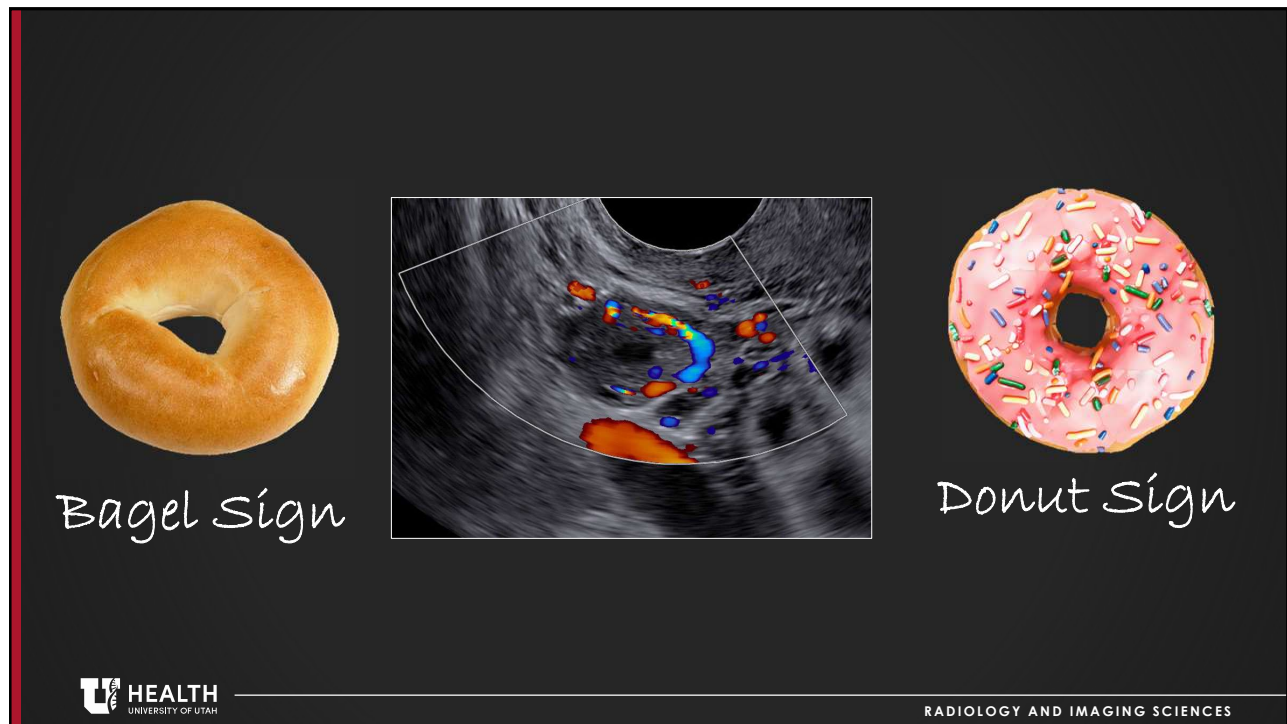
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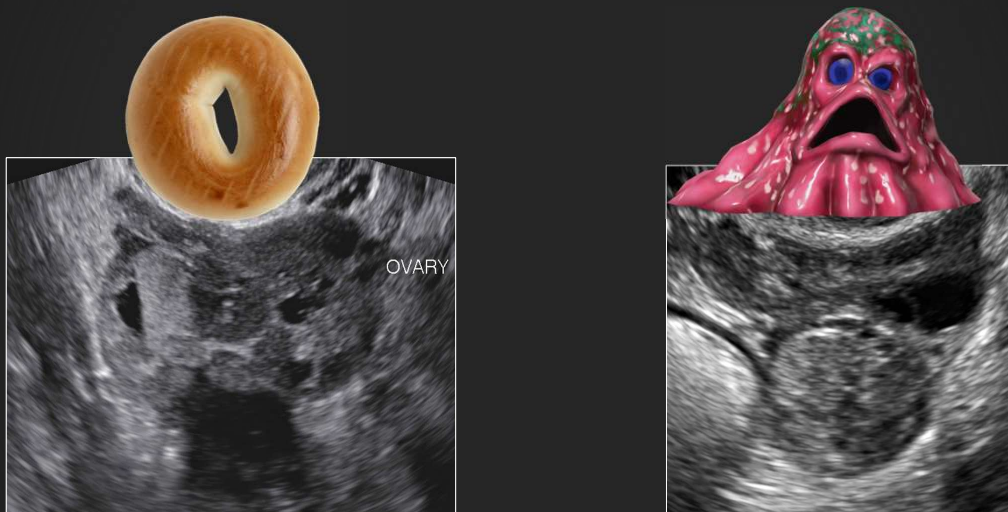


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# BLOB SIGN




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Today's word is:


Adnexal Ring



OVARY

Word of the Day

Extraovarian Mass  
or  
Adnexal Mass



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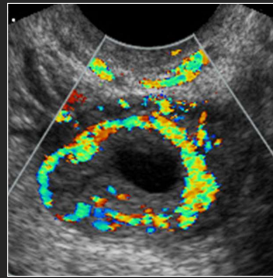
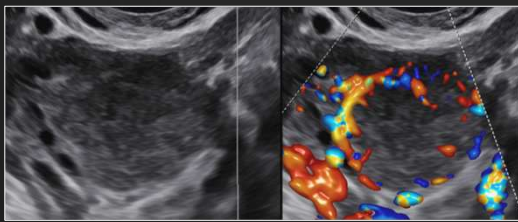
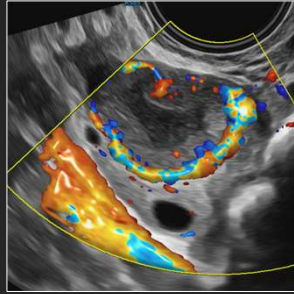
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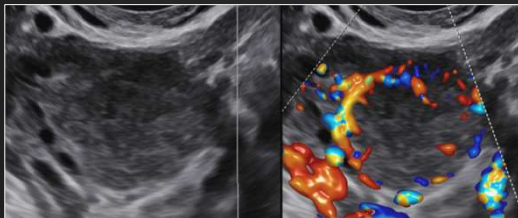
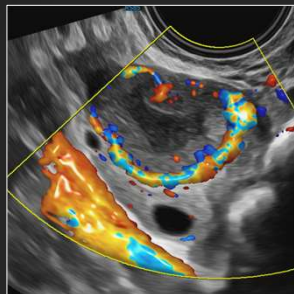


## CORPUS LUTEUM



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## CORPUS LUTEUM



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## FIRST TRIMESTER TERMINOLOGY

- **Definite intrauterine pregnancy:** Intrauterine gestational sac + YS or embryo, with or without cardiac activity
- **Probable intrauterine pregnancy:** Intrauterine sac-like structure

*WHERE IS THE SAC IMPLANTED?*

## CESAREAN SCAR ECTOPIC PREGNANCY



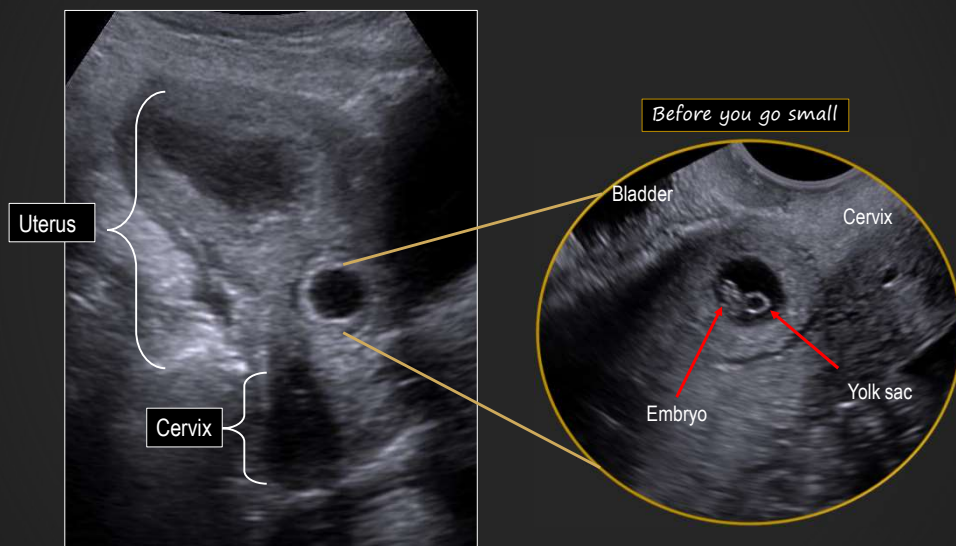
Timor-Tritsch IE, et al. Easy sonographic differential diagnosis between intrauterine pregnancy and cesarean delivery scar pregnancy in the early first trimester. Am J Obstet Gynecol. 2016 Aug;215(2):225.e1-7.



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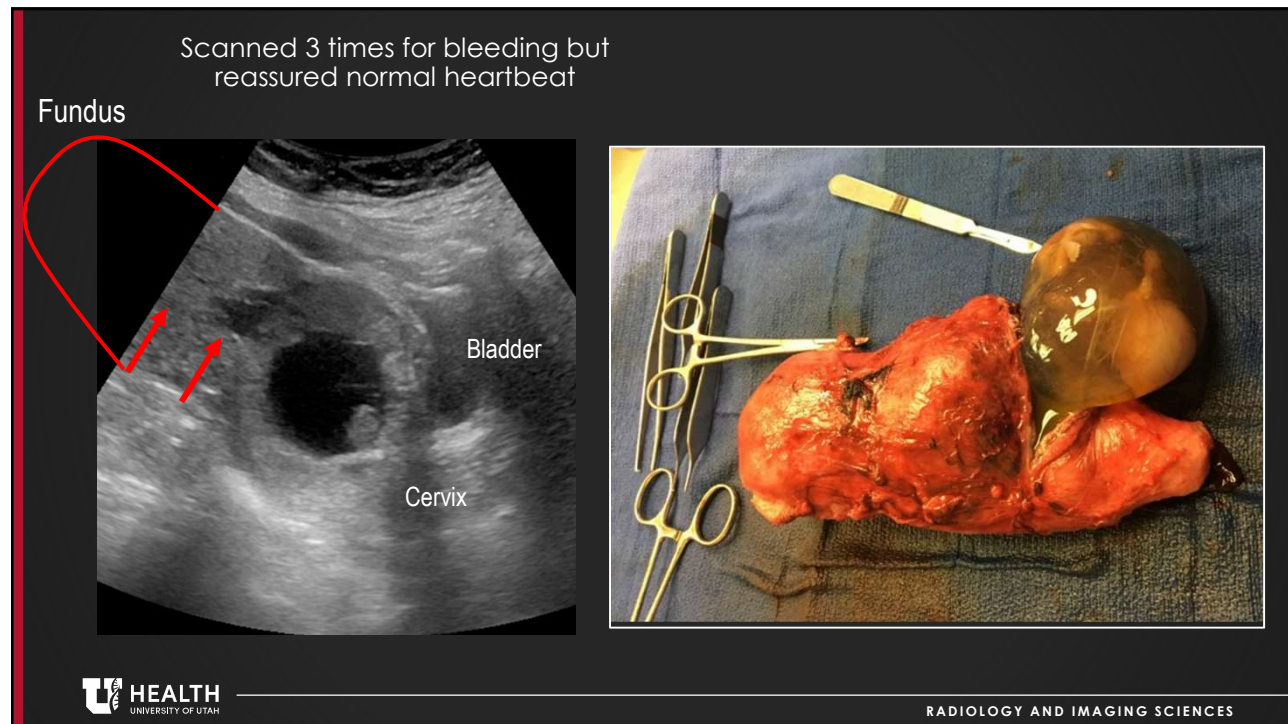
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## START BIG

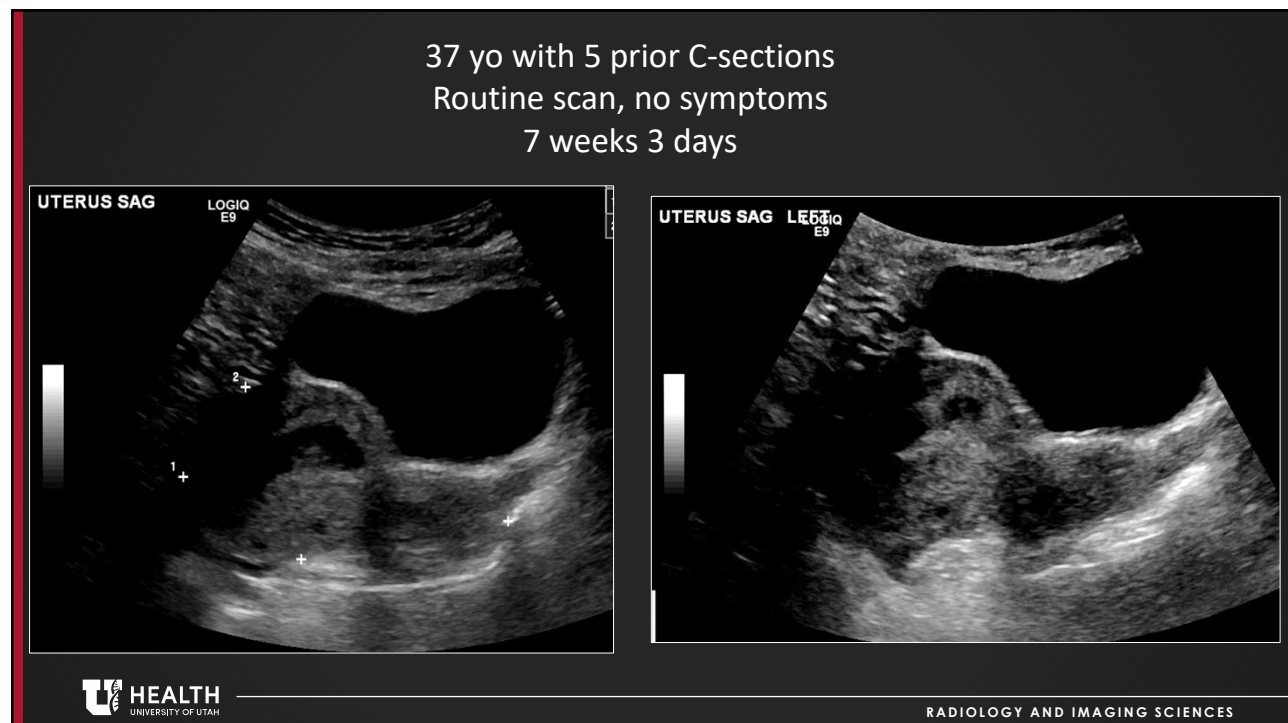


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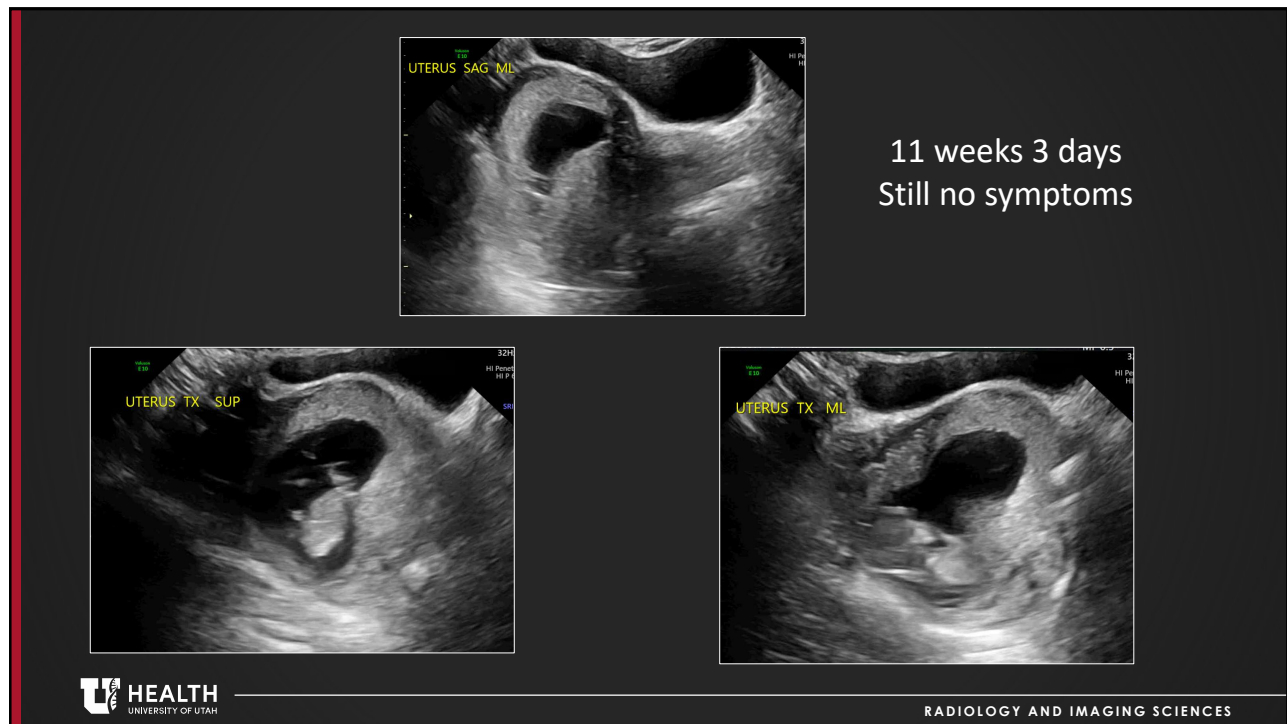
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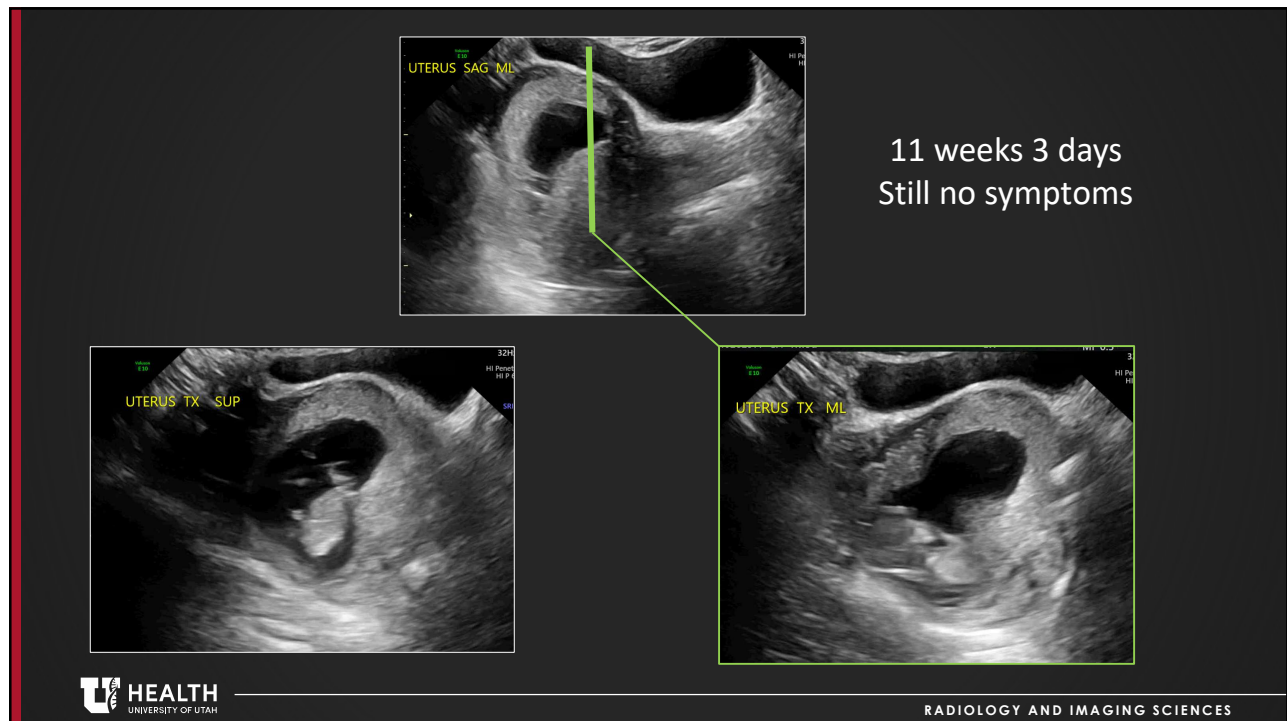
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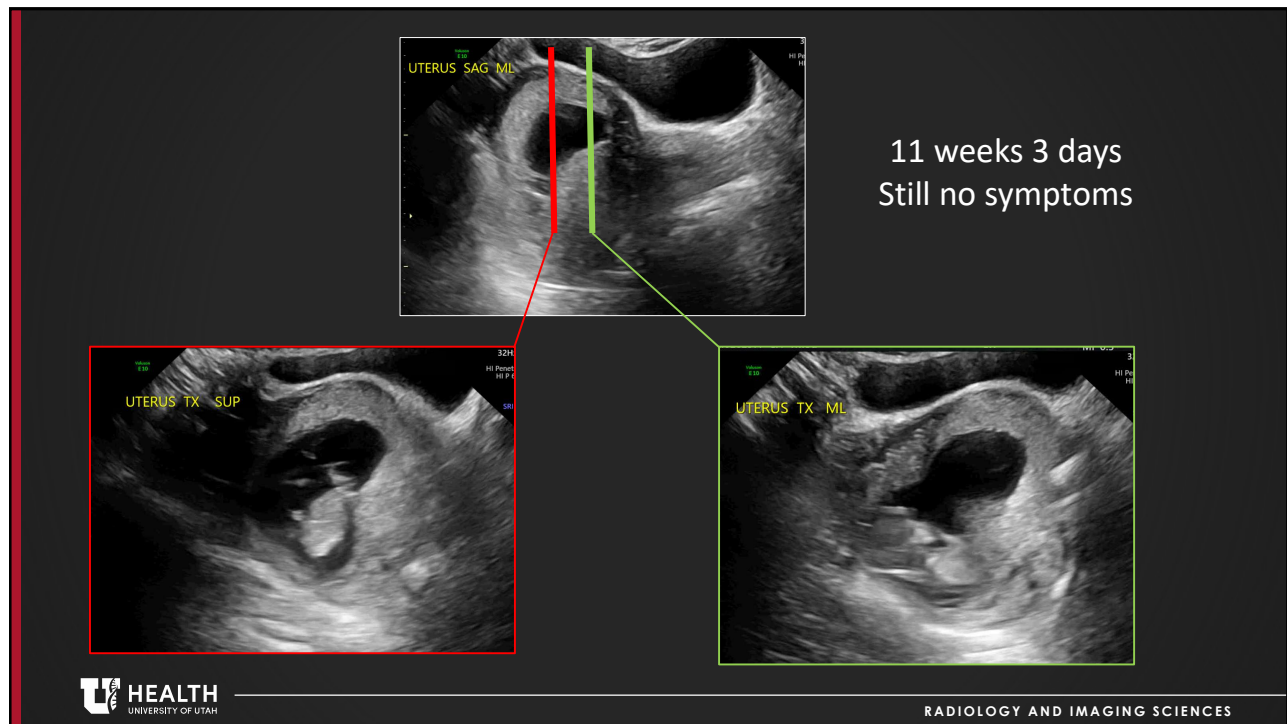


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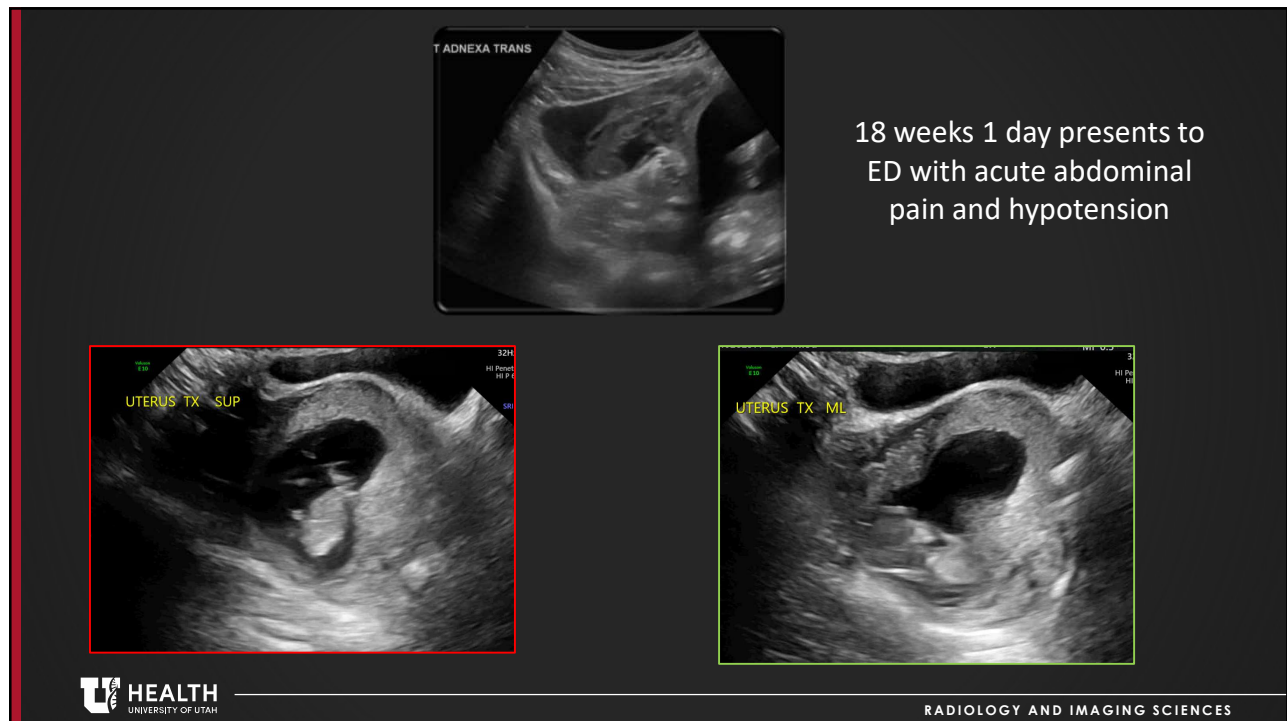


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## YOU MUST KNOW THE HISTORY!

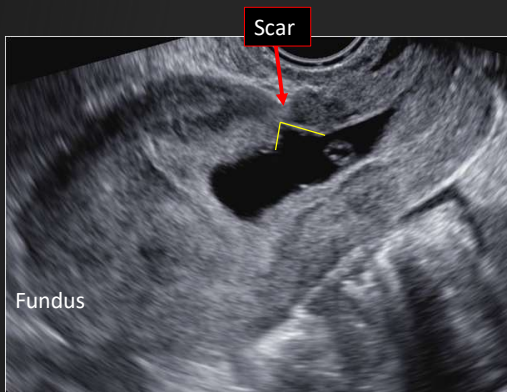
- Interpreted as abortion in progress and discharged from ED (no mention of prior cesarean delivery)



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## LOOK FOR THE SCAR

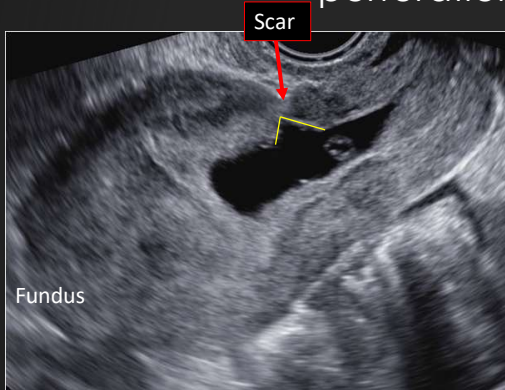
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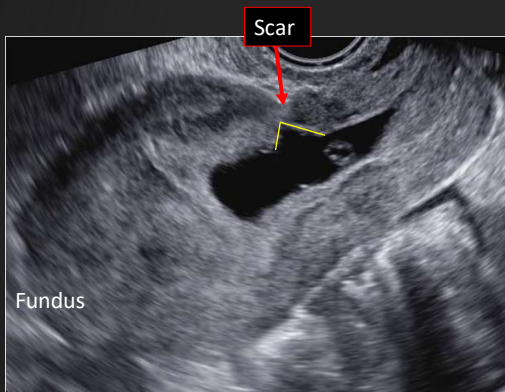
## LOOK FOR THE SCAR

- Returned with severe hemorrhage
- Emergency D&C in ED resulted in uterine perforation requiring hysterectomy



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## BEWARE OF ABRUPT ANGLES



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## A Really Scary Conversation in a Patient with Prior C-Section

?

"I'm sorry it looks like you are having a miscarriage"

"Good news – There's a heartbeat"

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# Bad Words!

Low  
Irregular

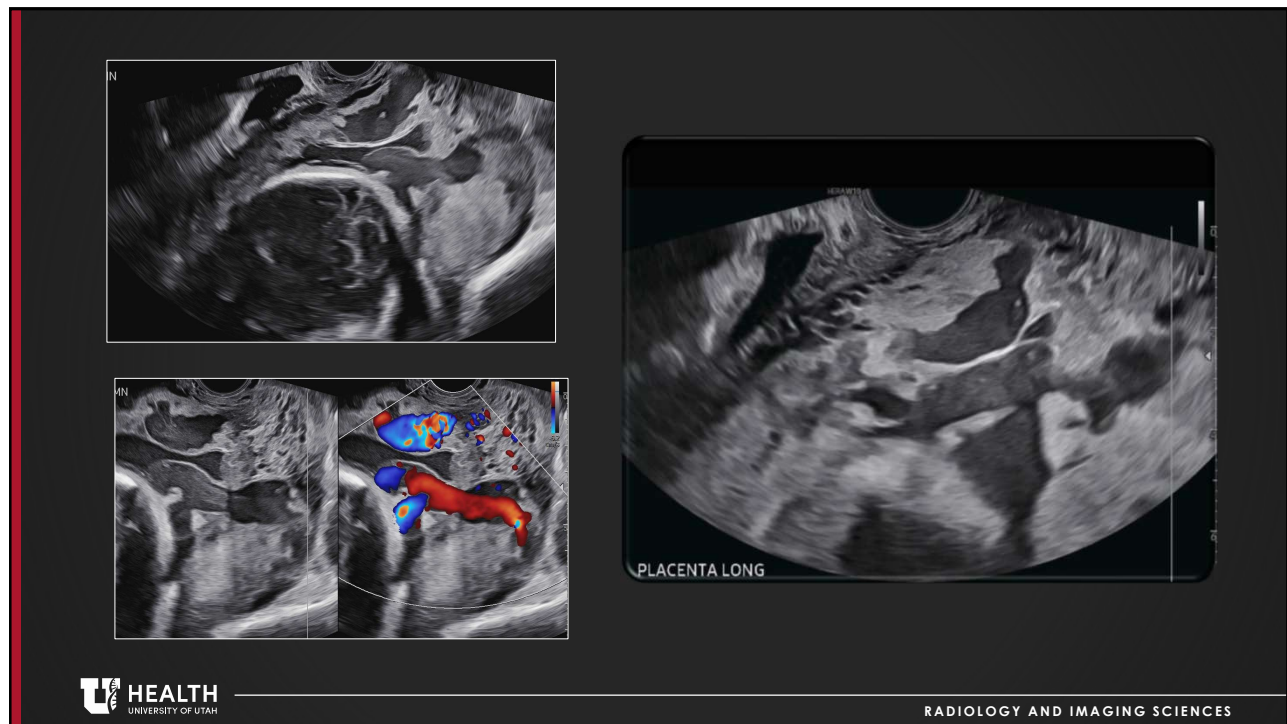
Pointy  
Triangular

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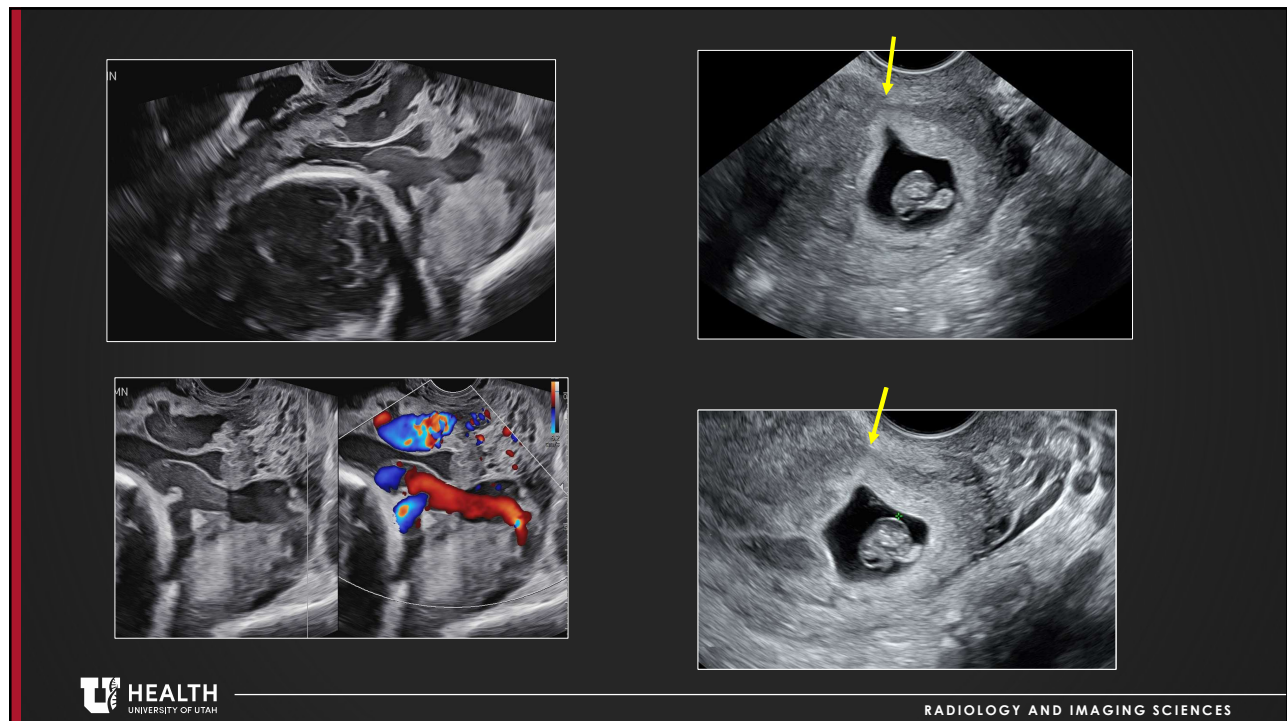
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## Clinic note

*"The sac is low, pointed and irregular"*



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