

Ob-Gyn Ultrasound: Only the Basics

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Lumen Weekly Cases

Case20

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Patient presented with nagging left shoulder pain.

List all of the salient findings in this CXR?

What diagnosis are you considering?

Case Answer

Loyola University Medical Education Network - Radiology curriculum - Medical students - Windows Internet Explorer

http://www.stritch.luc.edu/lumen/medEd/RadiologyCurriculum/radiology-curric_1_f.htm

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Loyola University Medical Education Network - Radiology Curriculum / Medical Students

Chicago's Jesuit University
 LOYOLA UNIVERSITY
 STRICHO
 School of Medicine

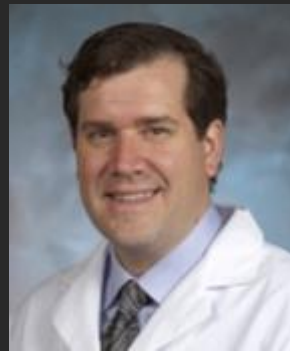
Contact Us | Main Menu | Structure | Mechanisms | Neuro | PCM | Medicine | Surgery | OB_Gyn | Pediatrics | Family Medicine | L.U.M.E.N.

Goals and Objectives
 Course Based Implementation
 Imaging Procedures
 Radiology Lectures
 Instructions/Overview
 Evaluation Strategy (past)
 Credits

ACADEMIC YEAR 2013

Course Director: Arcot J. Chandrasekhar, M.D.
 Professor of Medicine
 Associate Dean for Computers in Medical Education

Assistant Course Director: Jennifer Lim-Dunham, M.D.
 Associate Professor of Radiology and Pediatrics



Dr. Tim Ozga

Overview

Pelvic sonography is the imaging modality of choice for evaluating the female pelvis.

US uses NO ionizing radiation (which can cause cancer and birth defects in fetus)

GOALS&OBJECTIVES

- US images are obtained, US image orientation, US terminology, how sound waves travel
- normal uterine and ovarian anatomy
- first and second trimester pregnancy normal appearance and measurements used for dating
- Systematic approach to reading US
- This is NOT intended to cover all Ob Gyne pathology

US terminology

Isoechoic- Same brightness as surrounding soft tissue structures

Hyperechoic- Brighter than surrounding soft tissue, “whiter”

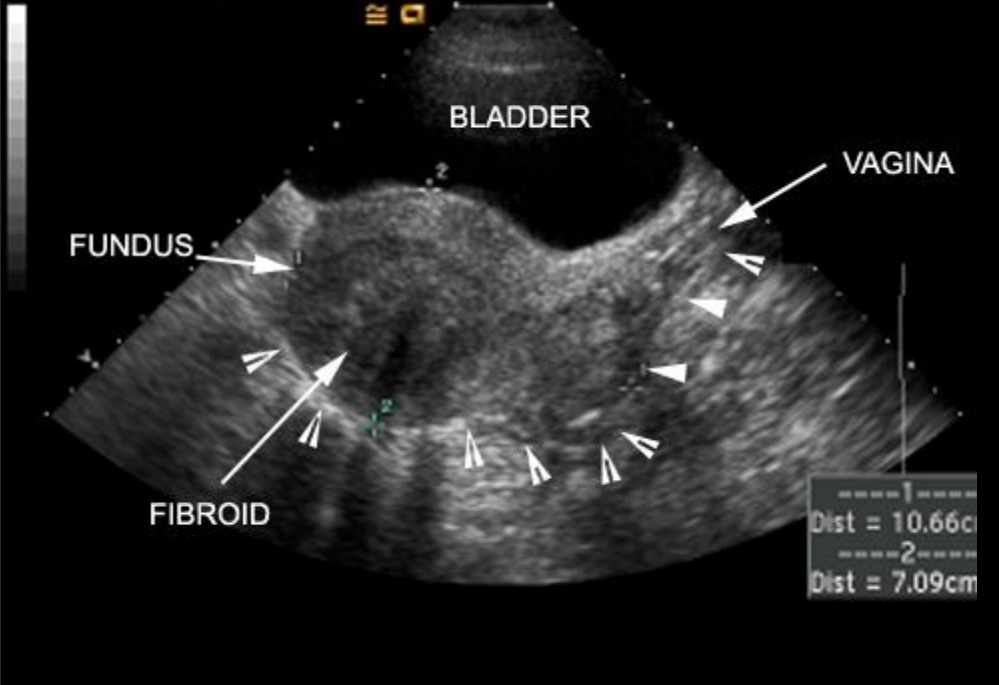
Hypoechoic- Darker than surrounding soft tissue, “blacker”

Anechoic- Completely black, no echoes. This is what fluid looks like.

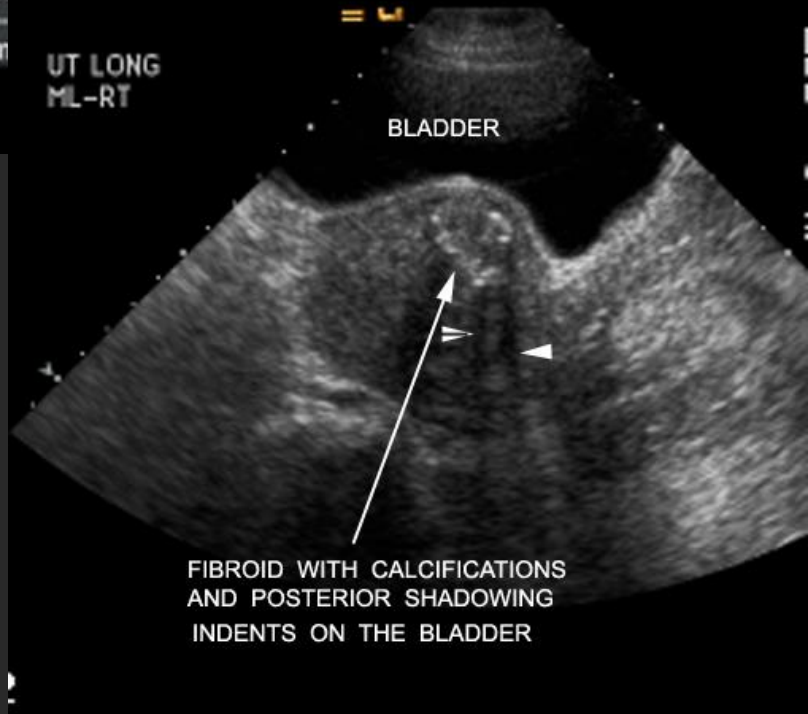
Sound waves

- Ultrasound transducer sends sound waves through the body. Sound waves are reflected differently by various types of tissue, and sent back to transducer where signal is transformed into visible image
- Sound waves travel through soft tissue or fluid. These types of structures are used as “windows” for US scanning
- Sound waves do not travel through and are reflected by air or bone (calcium), resulting in shadowing behind these structures

LONGITUDINAL SCAN PELVIS



UT LONG
ML-RT



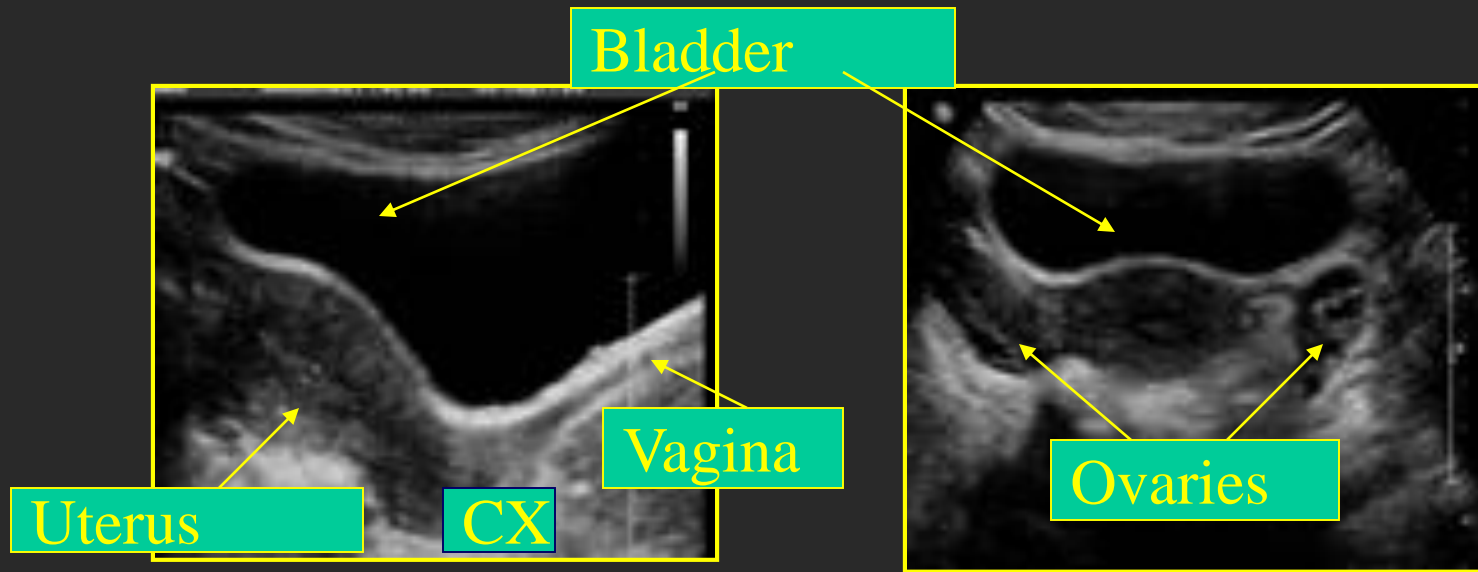
Technique

- The standard pelvic examination
 - Composed of the traditional transabdominal approach (TAS)
 - Combined with transvaginal sonography (TVS)
 - Frequently using Doppler sonography

Technique

- Transabdominal sonography uses a distended bladder as window to pelvic structures for a global view.

Transabdominal Sonography

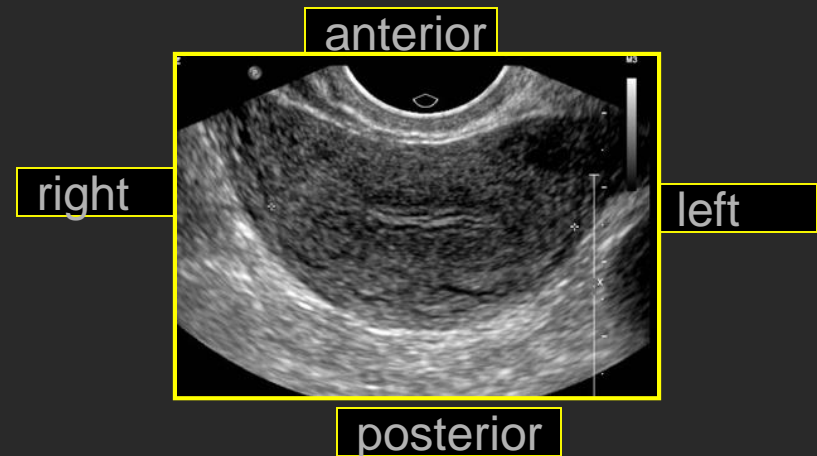
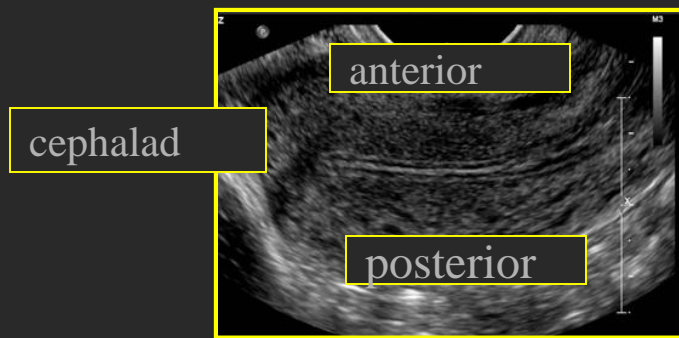
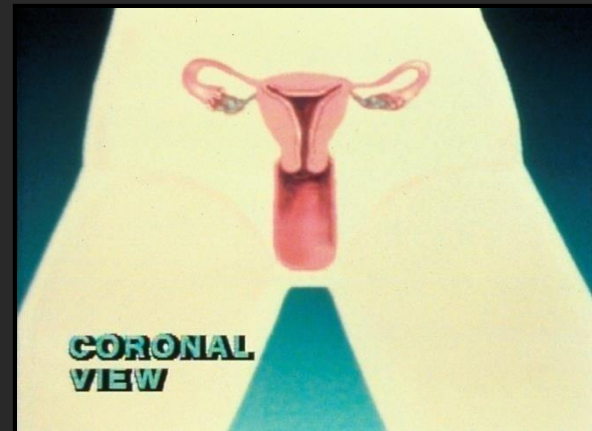
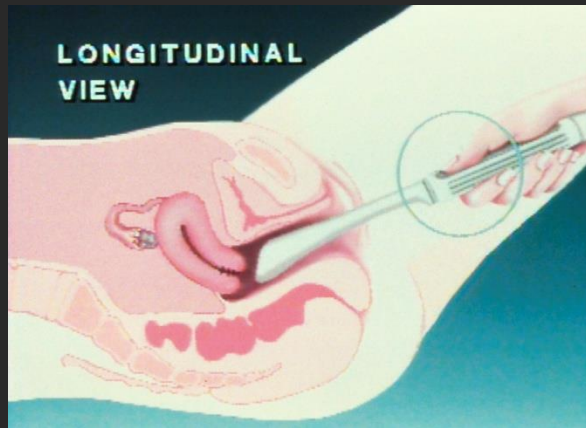


- Sagittal and transverse views of the pelvis
- Uterus on sagittal has “teardrop” appearance

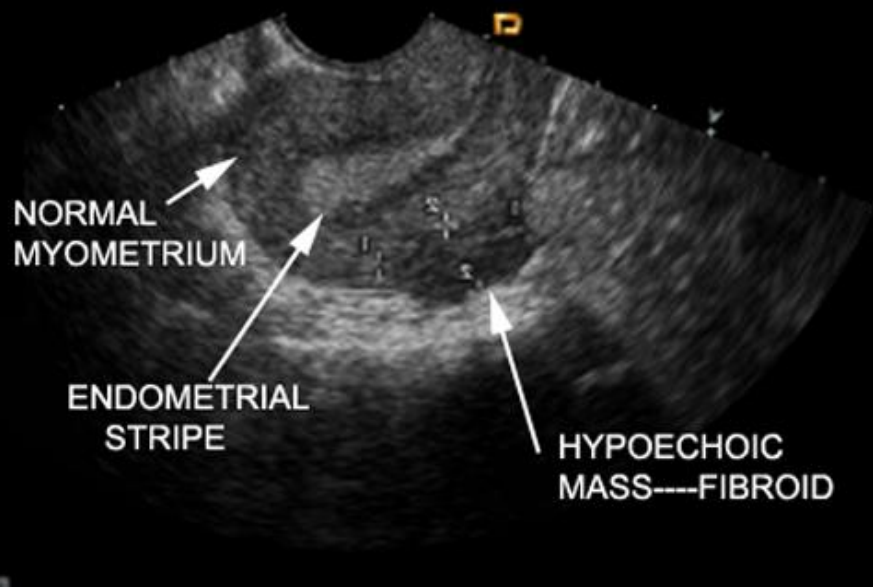
Technique

- Transvaginal sonography gives a more detailed evaluation of pelvic architecture using higher-frequency transducers at closer proximity to pelvic structures.

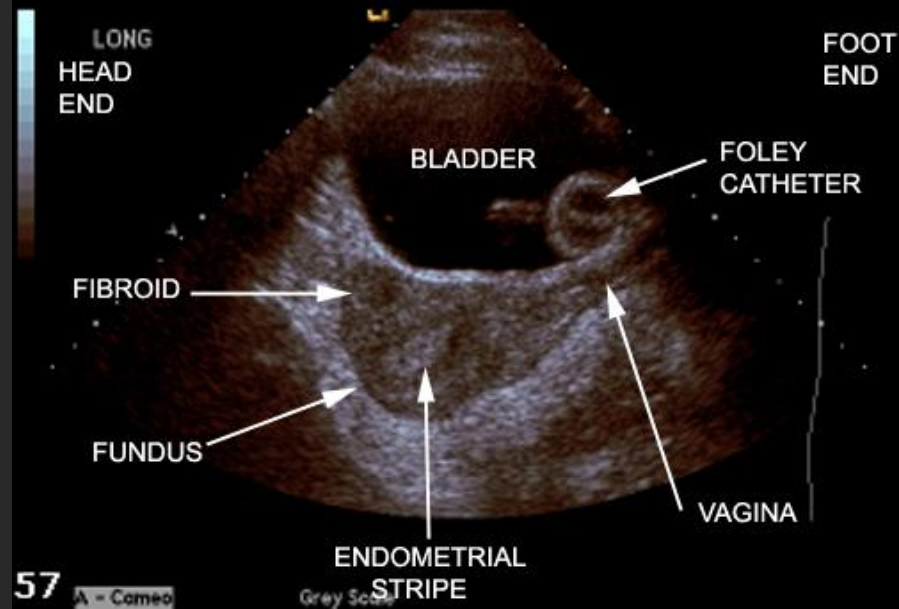
Transvaginal Sonography



UTERINE FIBROID POSTERIOR WALL

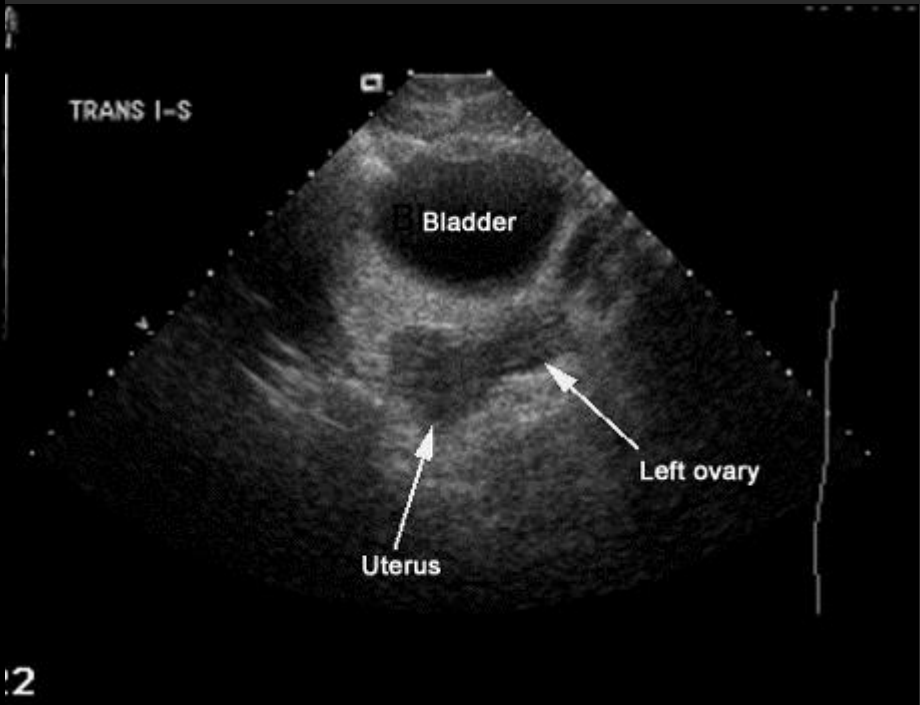
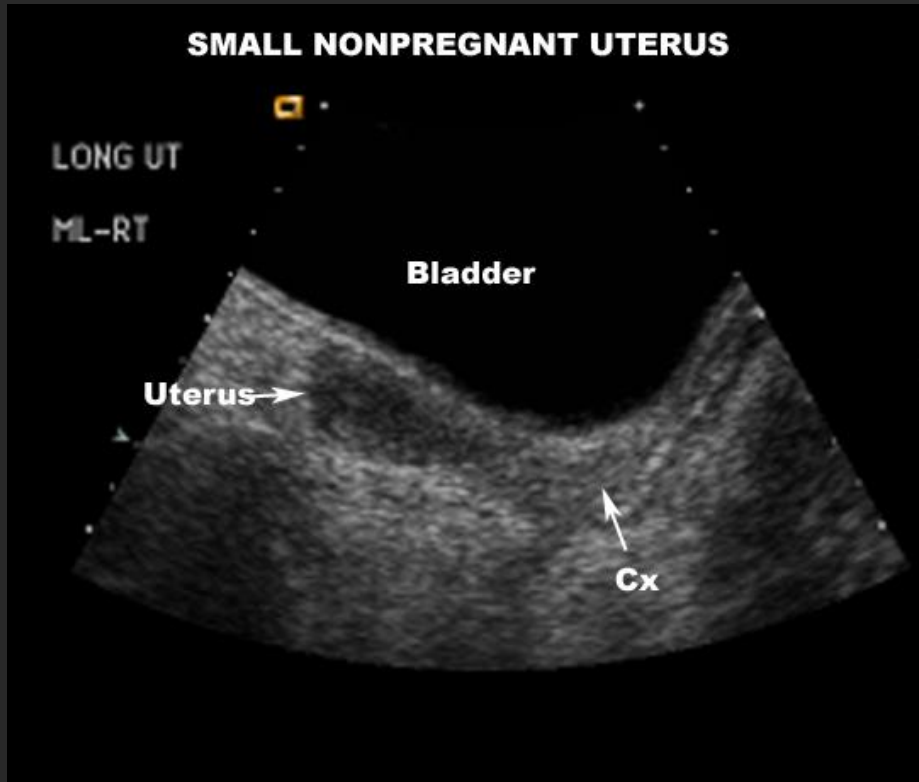


RETROVERTED UTERUS WITH A FIBROID



Transvaginal US

Transabdominal US



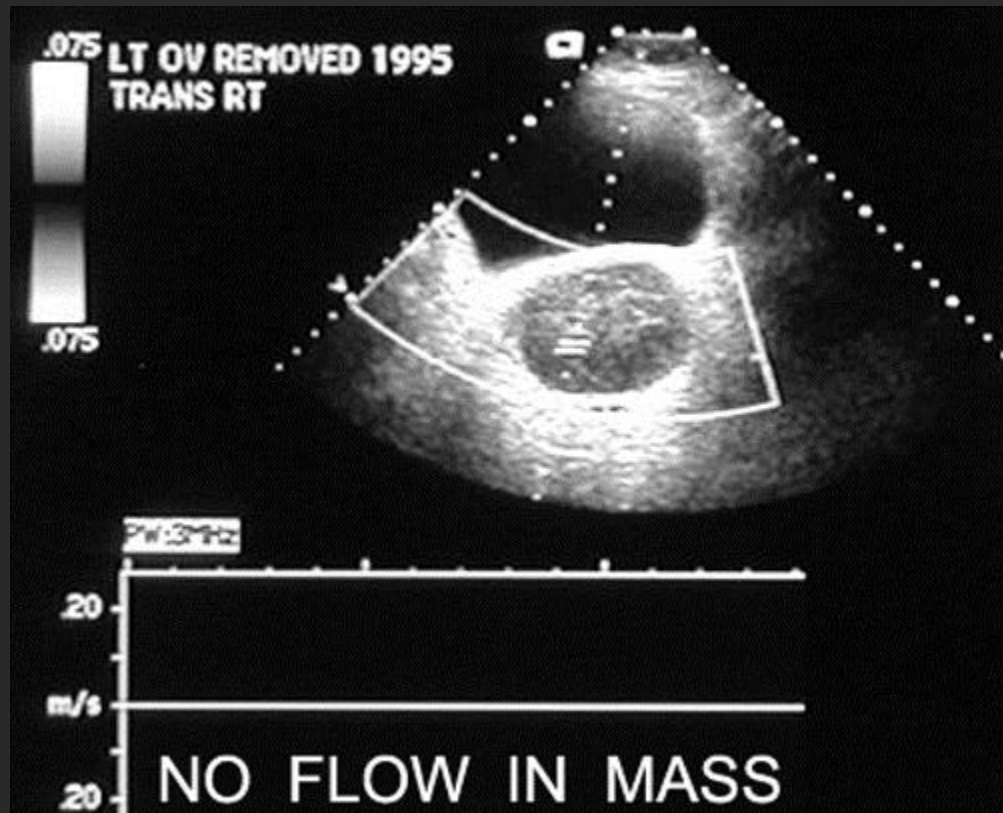
Use all the information from the labeling that you are given to orient yourself to anatomy

Long= longitudinal, usually sagittal relative to body.

Convention: patient's head to left of screen.

Trans=transverse, usually axial relative to body.

Convention: patient's right side to left of screen.



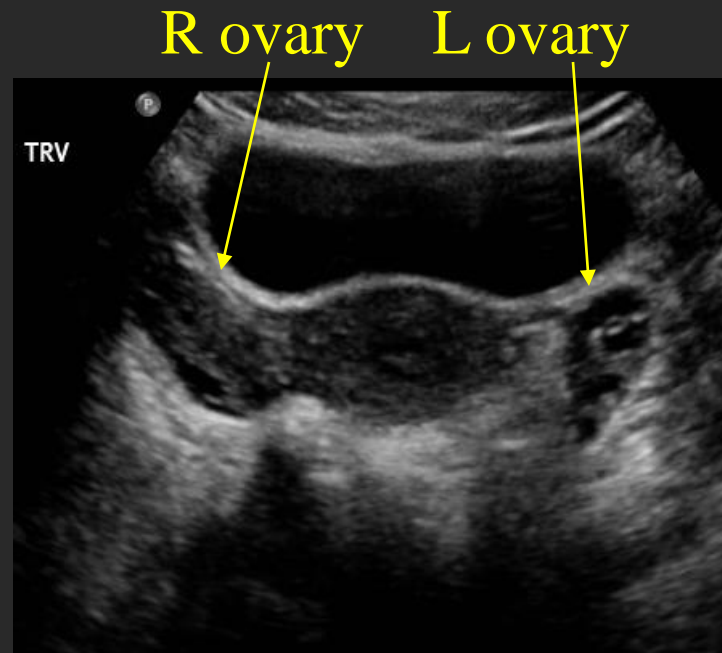
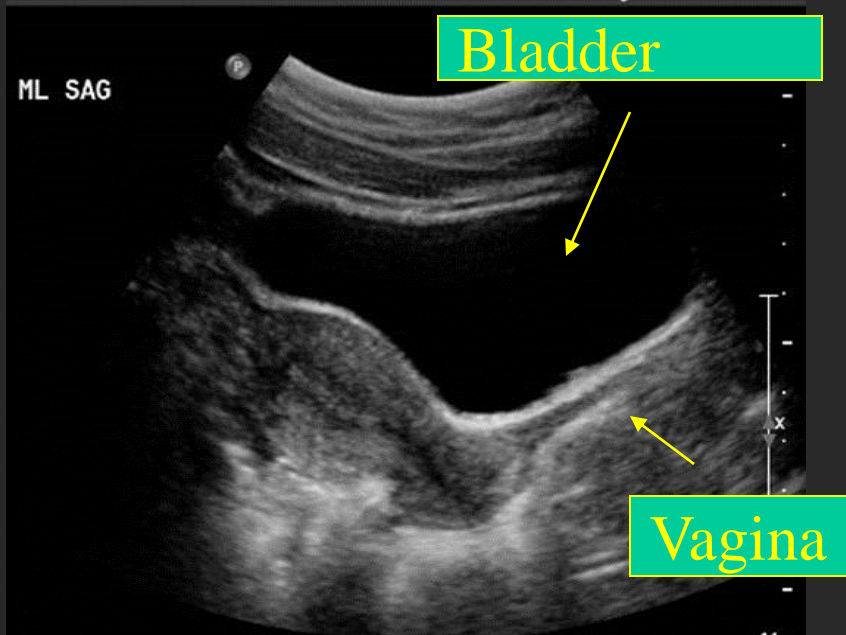
Use all the information from the labeling that you are given to orient yourself to anatomy and history

The Normal Sonographic
Appearance of the Nongravid
Genital Tract

Pelvis



Anatomy Pelvis

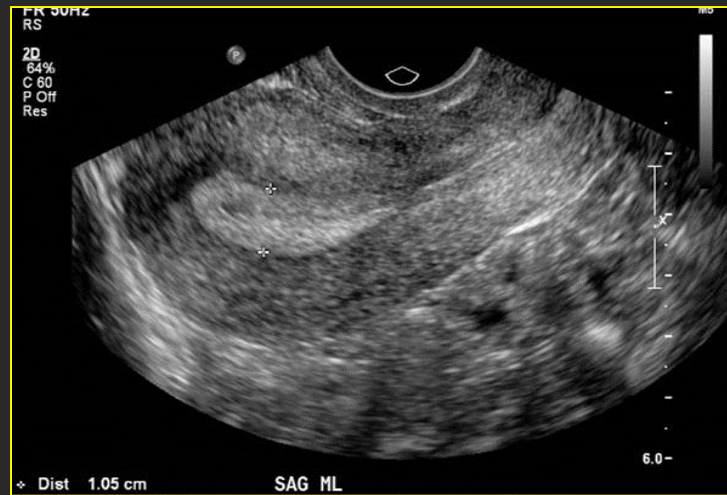


Uterus: cervix, body, fundus

Premenopausal Endometrium



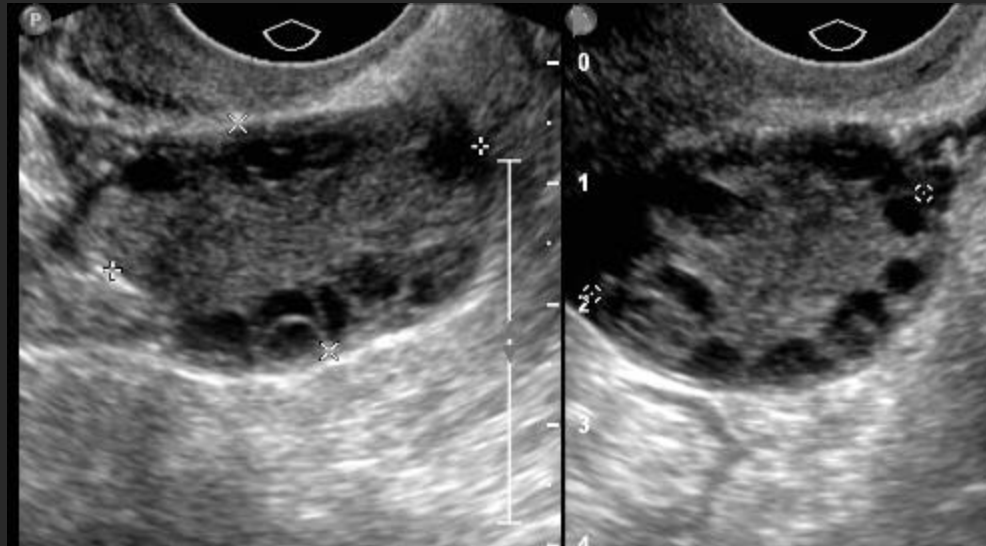
Proliferative



Secretory

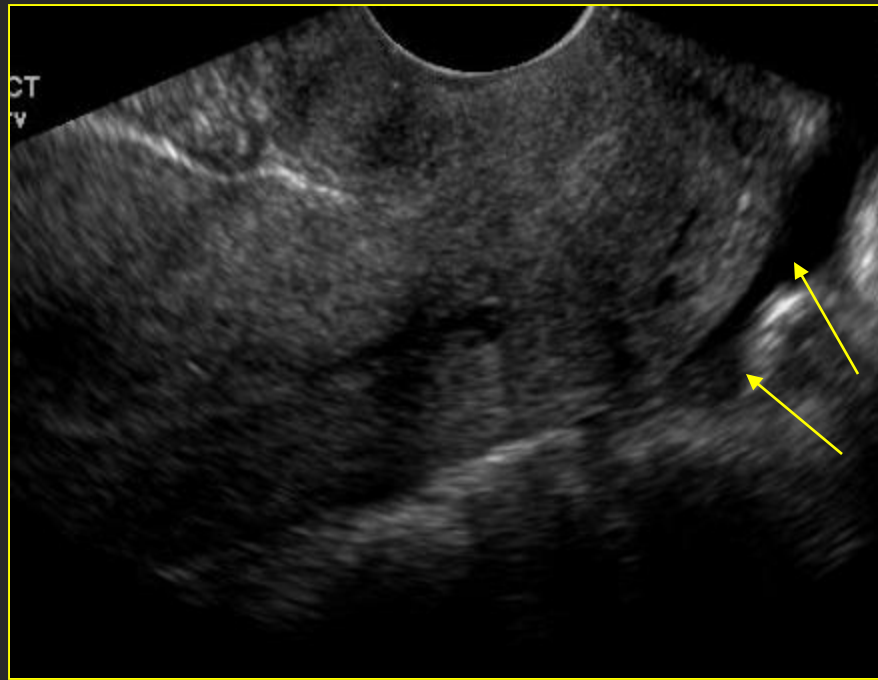
Uterine anatomy: myometrium vs. endometrium

Ovary



- The ovaries are ellipsoid and can be identified in menstruating females by the presence of follicles.

Cul-de-sac



- Physiologic fluid in cul-de-sac

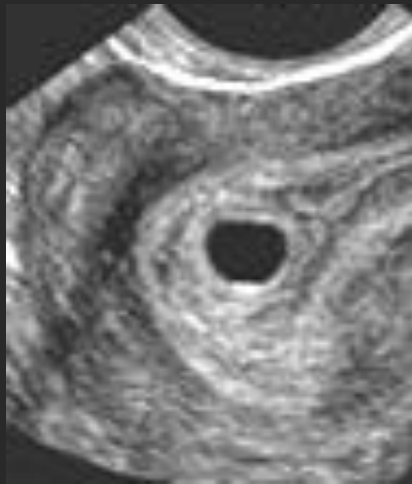
Basic obstetrical ultrasound

LMP? Pregnant?

- In the female in the reproductive years, the physiologic as well as the pathologic processes are driven by the menstrual cycle and hormonal stimulation.
- Therefore, know the day of your patients' day of the cycle, therefore...
- Know if your patient has a positive pregnancy test, and if so, what the quantitative serum beta hCG is.

Early Gestational Sac

- Decidualized endometrium = echogenic
- Early gestational sac 16-21 days after conception
- Yolk sac seen about 5 weeks



First Trimester

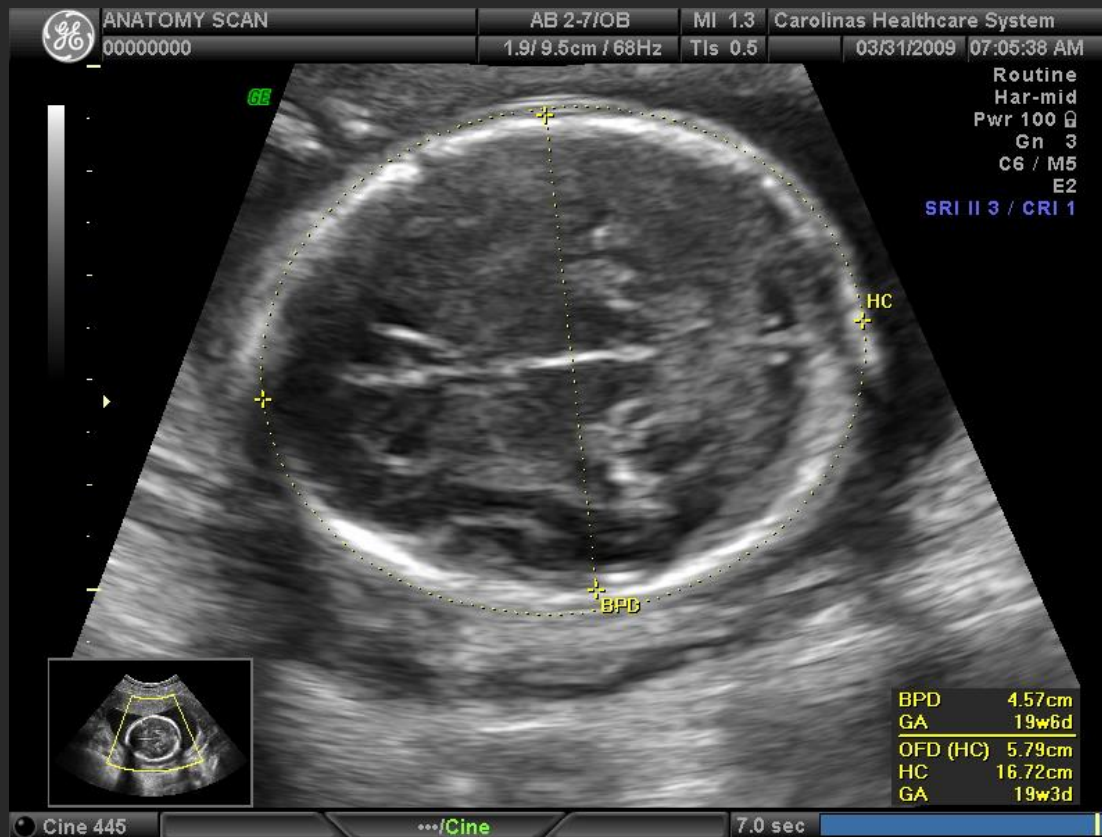
- By the 6th menstrual week, the early embryo can be identified.
 - Usually with cardiac activity
 - The crown-rump length (CRL) is the best estimation of GA once appears.



Second Trimester

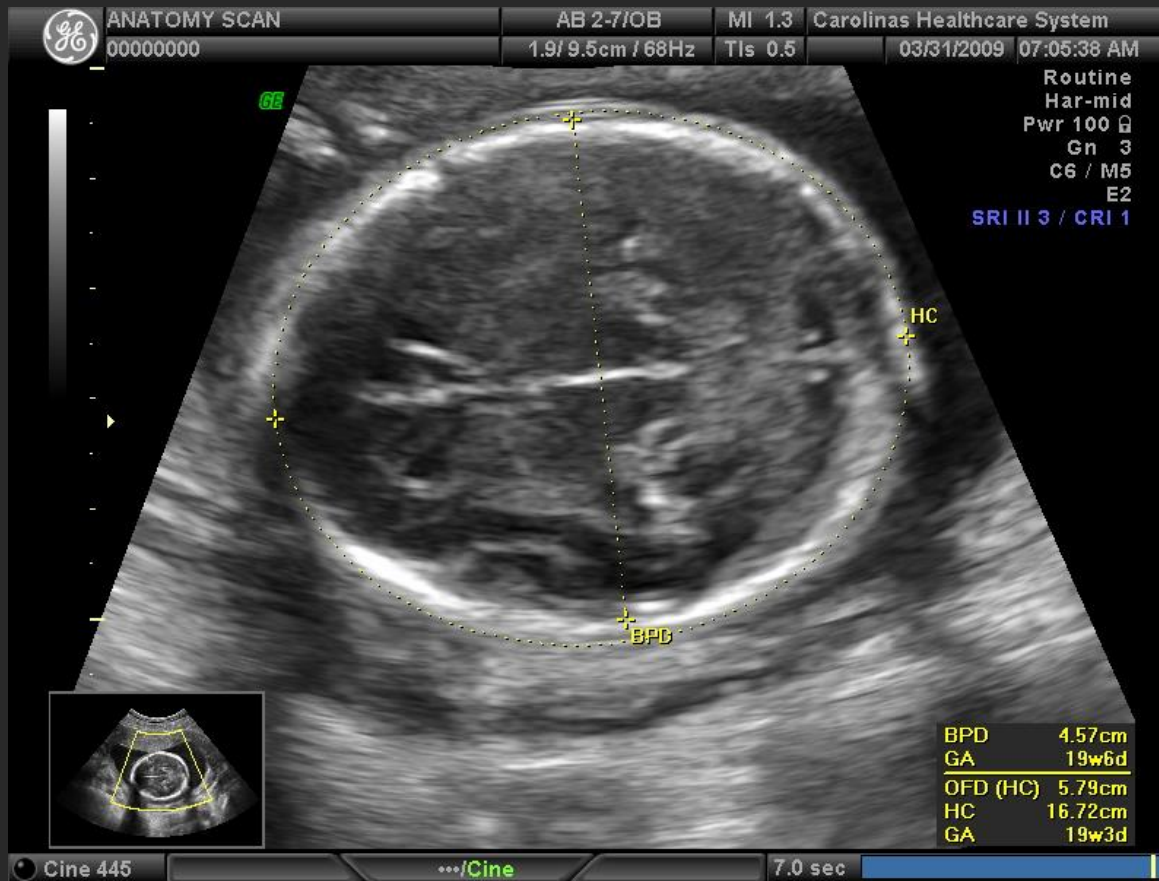
- After 13-14 weeks, measurements used for dating are:
biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), and femur length (FL)

Fetal dating: BPD biparietal diameter



BPD measured from outer to inner

Fetal dating: HC head circumference



Note: HC measured on the outside

Fetal dating: FL femur length



Only ossified bone is measured

Fetal dating: AC abdominal circumference

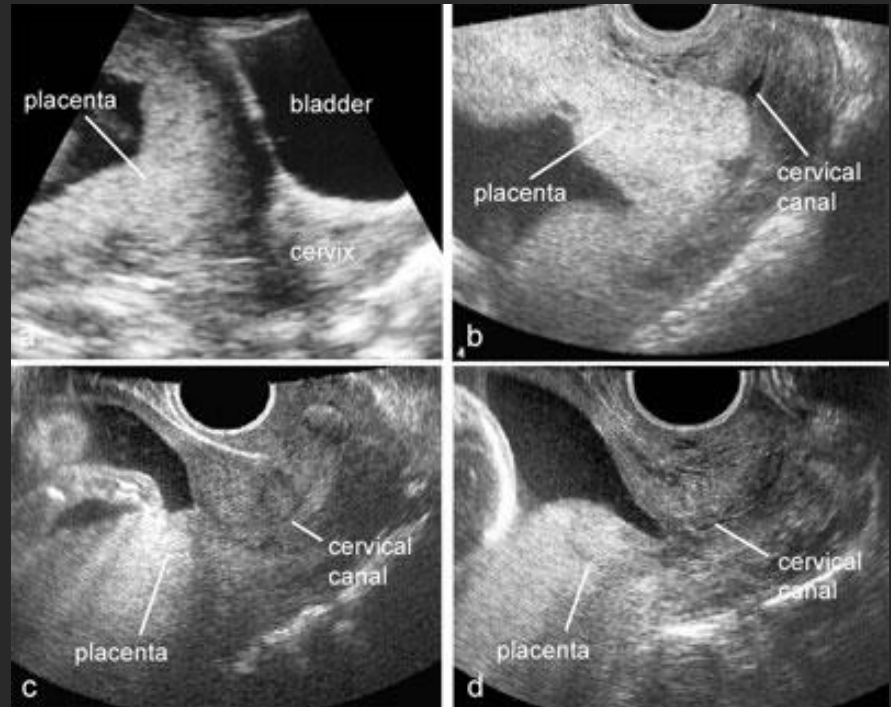
Note: AC is measured on outer circumference



Second Trimester

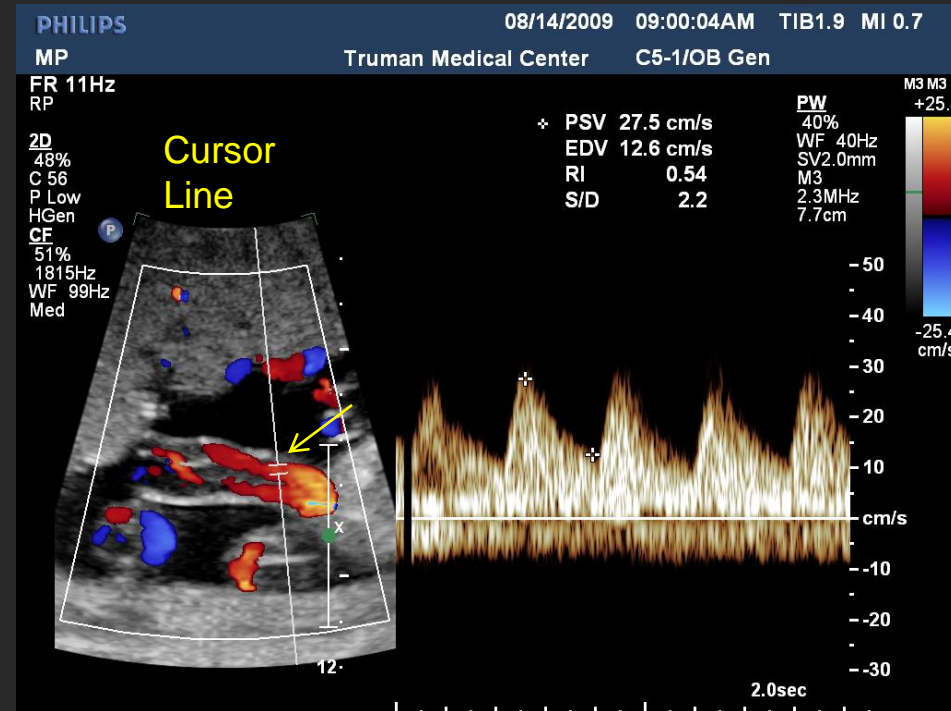
Placenta and cervix: placenta previa

- Placenta



Example of Color and Spectral Doppler Ultrasound

- Flow to the transducer is shown in red and away in blue.
- The Doppler sample volume (oblique arrow) shows the sampling site for pulsed Doppler interrogation.
- The right panel shows spectral Doppler of umbilical artery flow. As the flow is toward the transducer, it is depicted as positive or upward deflections.



Umbilical artery Doppler waves

Systematic approach to reading US

- Use annotation as cues for
- Approach (transabdominal or transvaginal)
- Orientation (long/sag or trans/axial)
- Laterality (right or left)
- Organ (adnexa/ovary, or uterus)

Systematic approach to reading US

- Uterus
 - Endometrium (thickness, gestational sac)
 - Myometrium (masses)
- Ovaries
 - Masses: cystic or solid, calcium
 - Doppler for blood flow
- Other
 - Free fluid in cul de sac
 - Pregnancy test
 - Compare to prior imaging studies, know clinical history

Take Home Points

- US is first line modality to examine female pelvis and gravid female pelvis
- US uses no ionizing radiation
- US uses sound waves, which travel best through soft tissue or fluid
- US can be performed transabdominally or transvaginally
- Conventional orientation for US images is used

Take Home Points

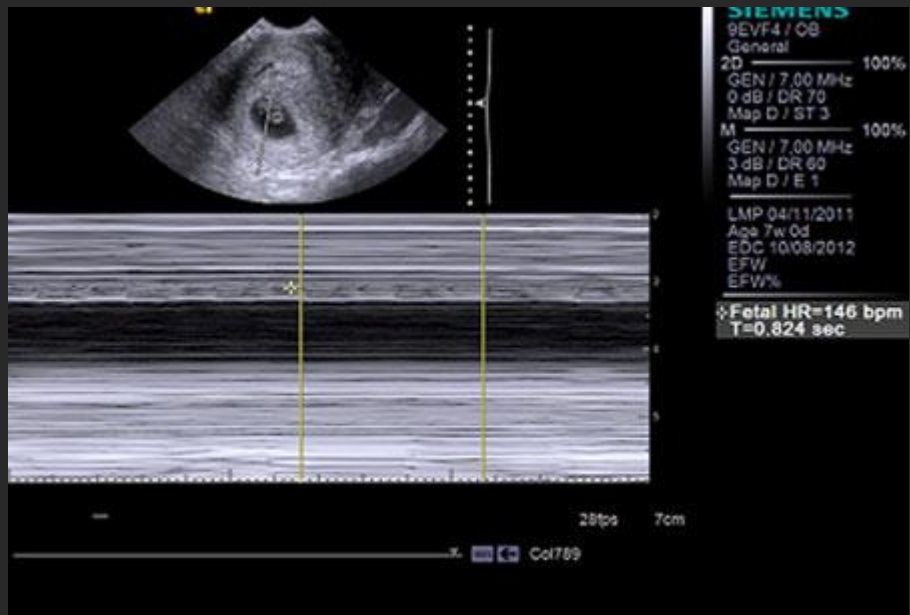
- Use terminology “hyperechoic” and “hypoechoic”
- Fluid is black or anechoic on US
- We reviewed appearance of normal uterine and ovarian anatomy
- We reviewed first and second trimester pregnancy normal appearance
- Measurements used for fetal dating: BPD, HC, AC, FL

Practice cases for students: Normal and abnormal

- Transabdominal, transvaginal or can't tell?
- Orientation, laterality, body part?
- Normal or abnormal (provide diagnosis or Ddx if possible)

Group 1





RS

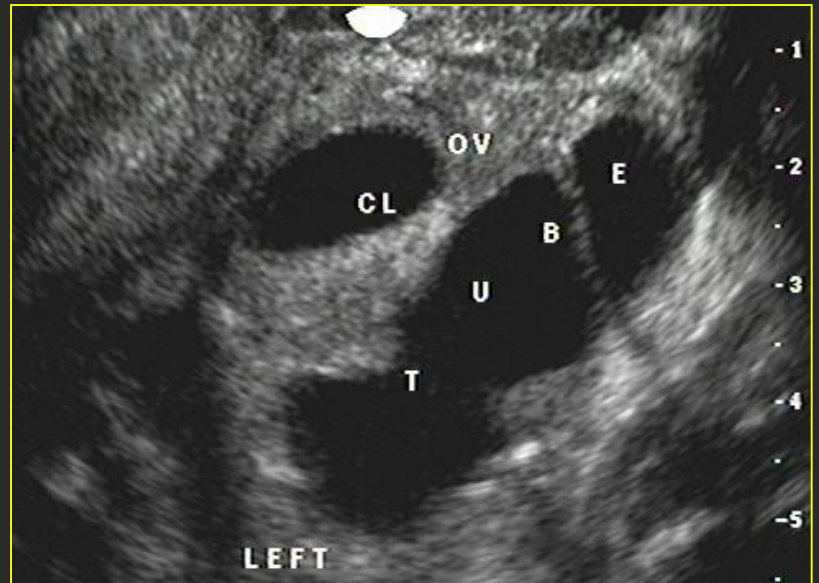
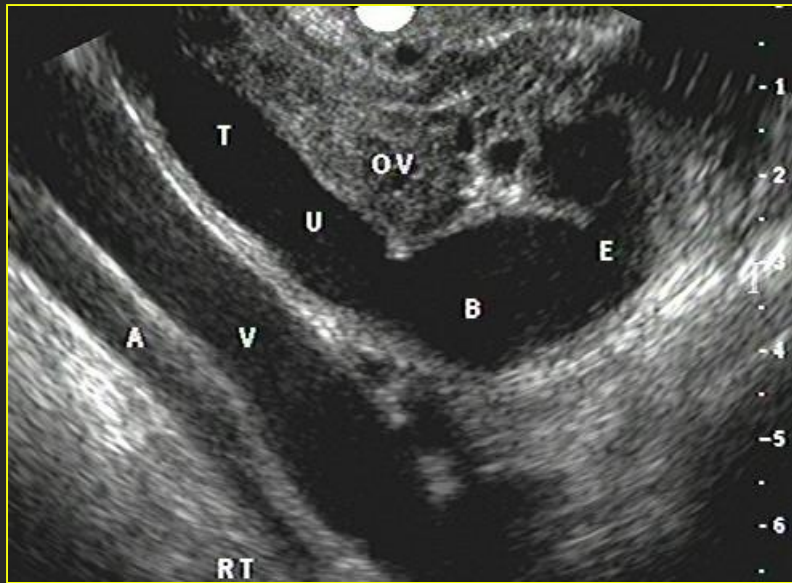
2D
67%
C 60
P Off
Res



[2D] G55/89dB/FA8/P90/FSI 1

27



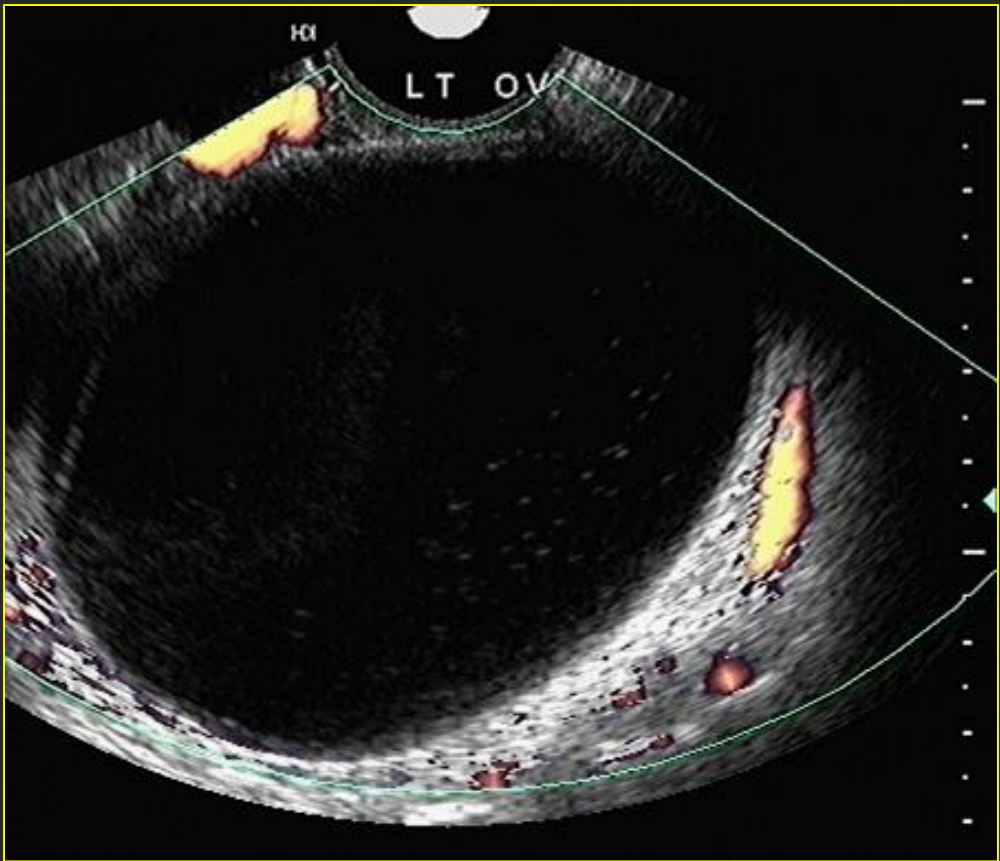


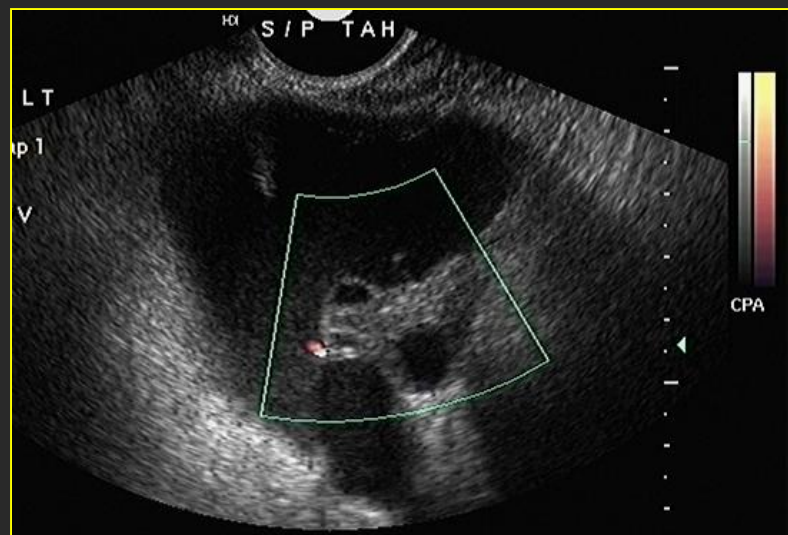
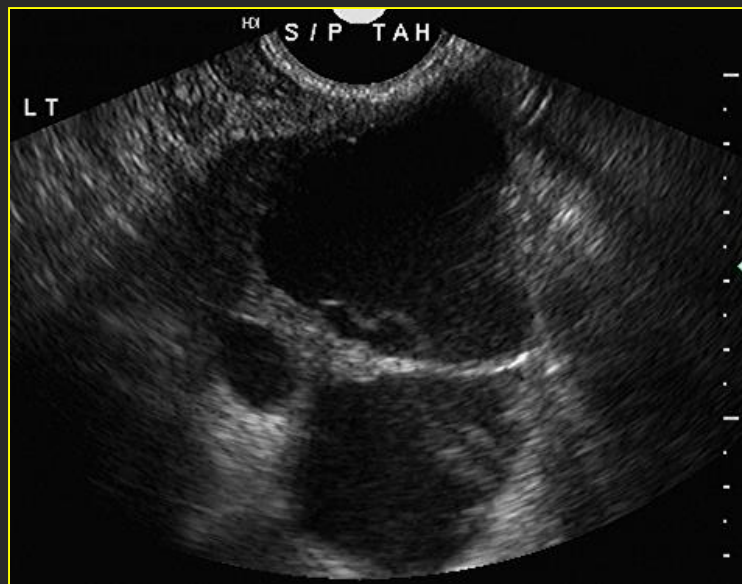
Group 2



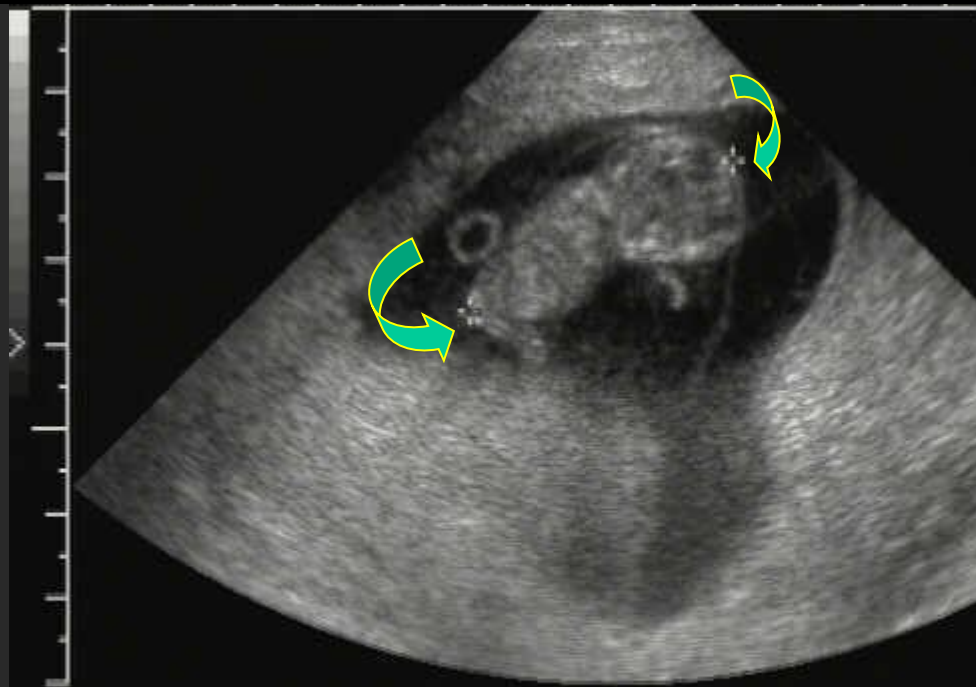








Group 3



CRL = 36.0mm MA=10W3D

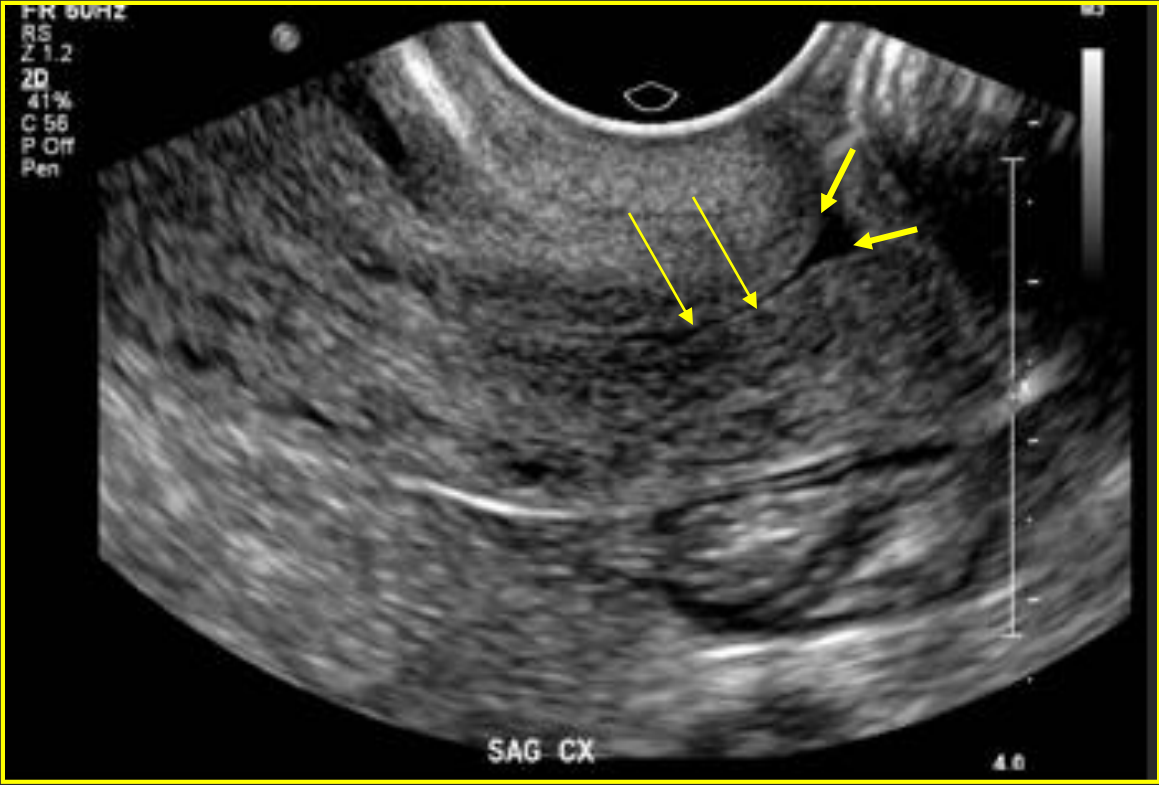
PRIOR MENU

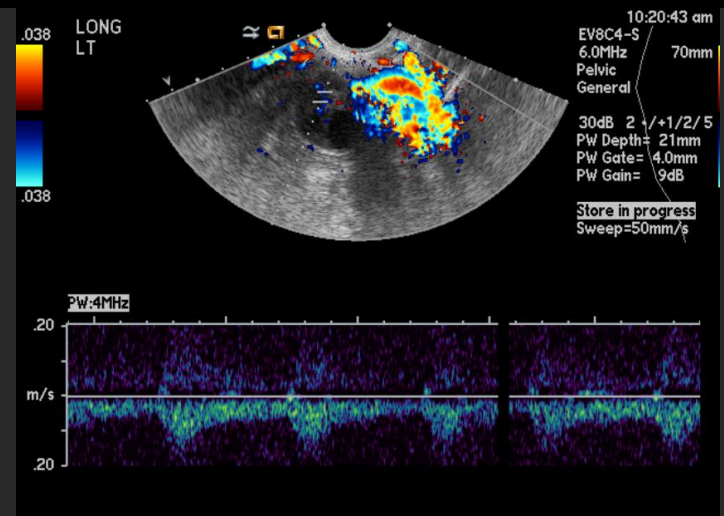
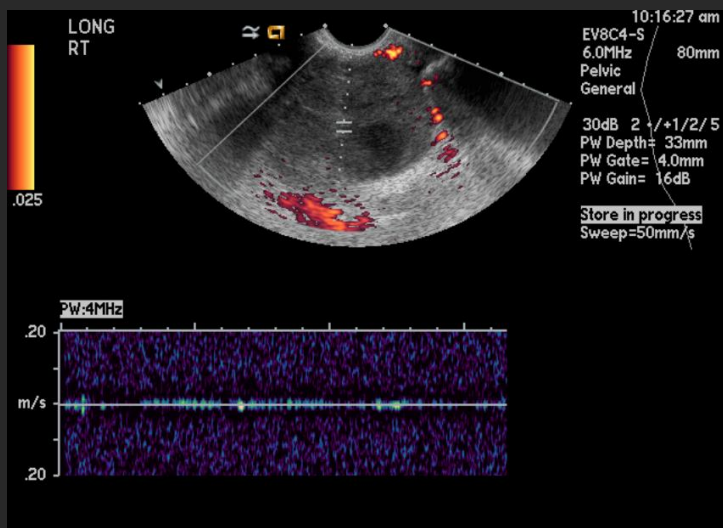
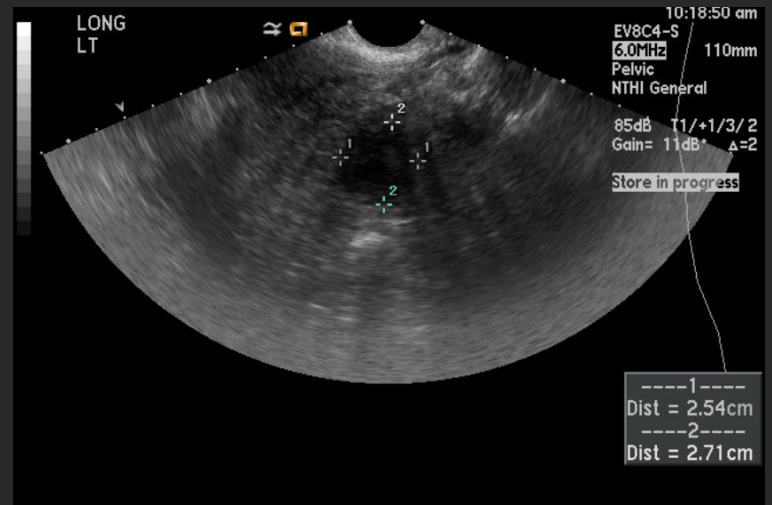
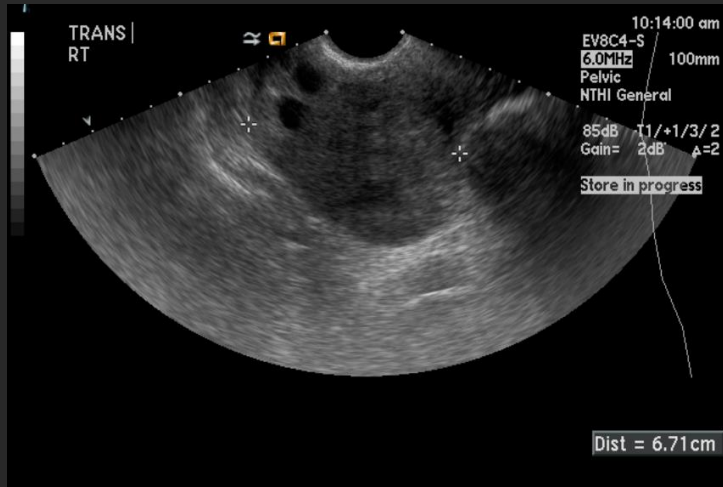
WRKSHT

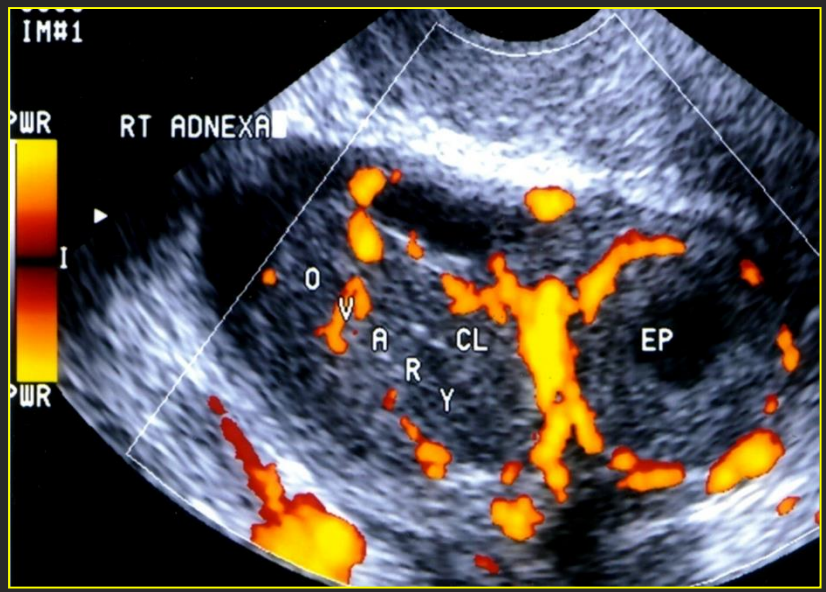
ENTER

CRL









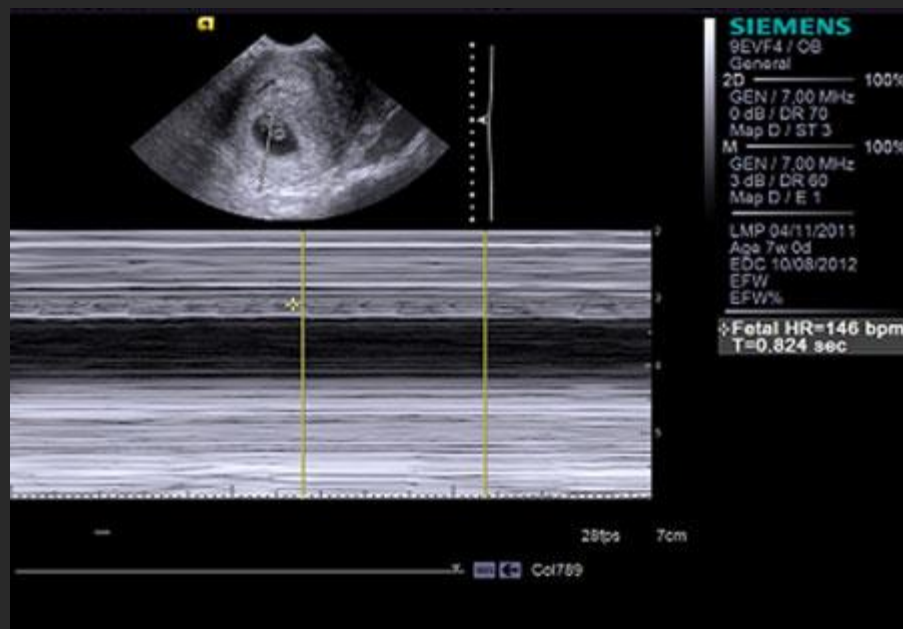
Answers

Group 1

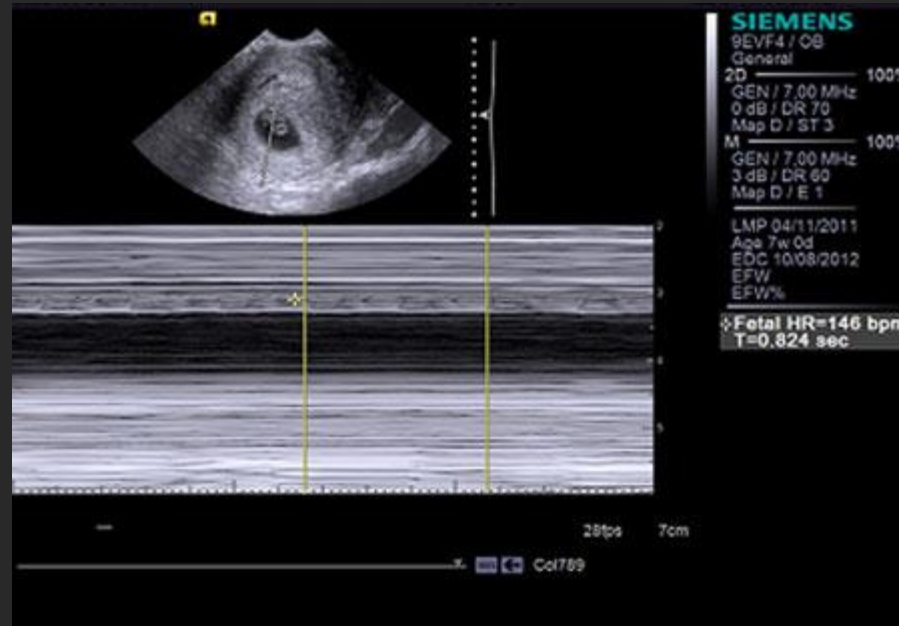


Normal fetal head, BPD and HC



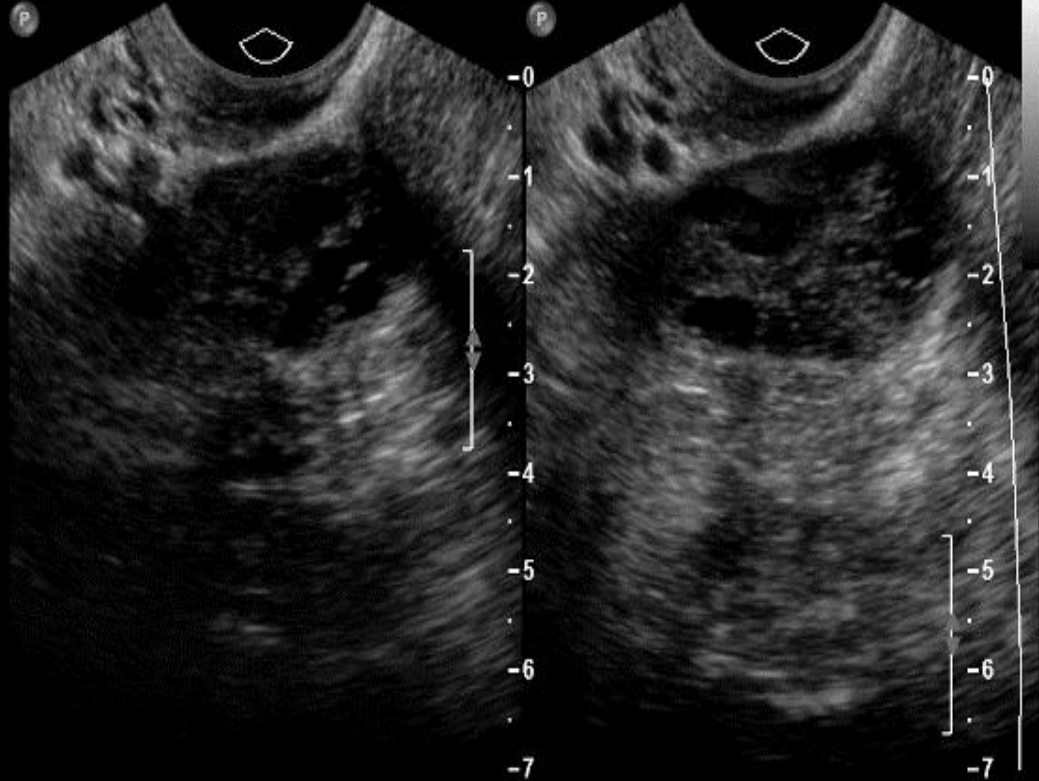


Normal early pregnancy, Cardiac Activity

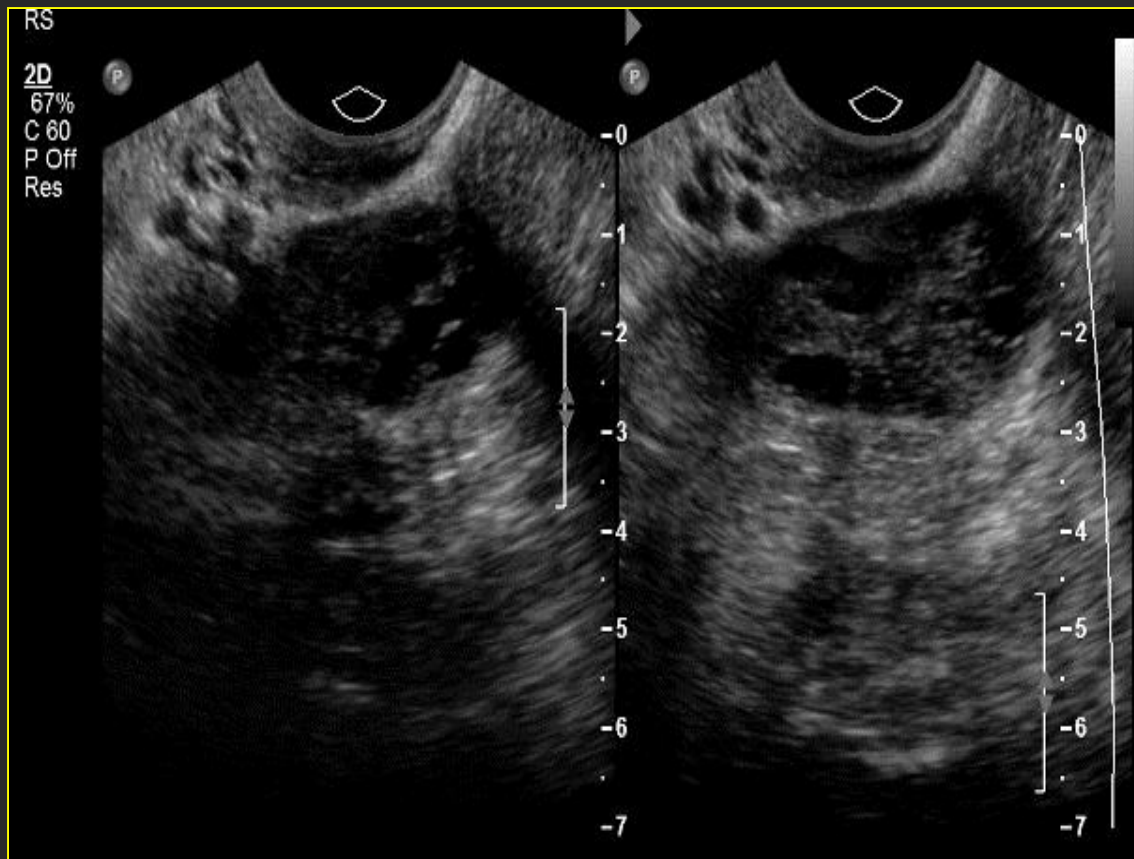


RS

2D
67%
C 60
P Off
Res



normal ovary with follicles



[2D] G55/89dB/FA8/P90/FSI 1



COLO

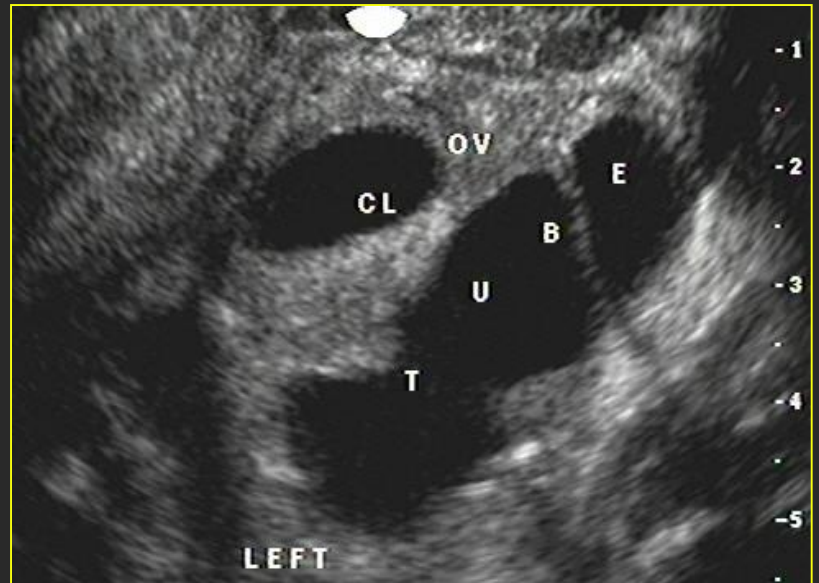
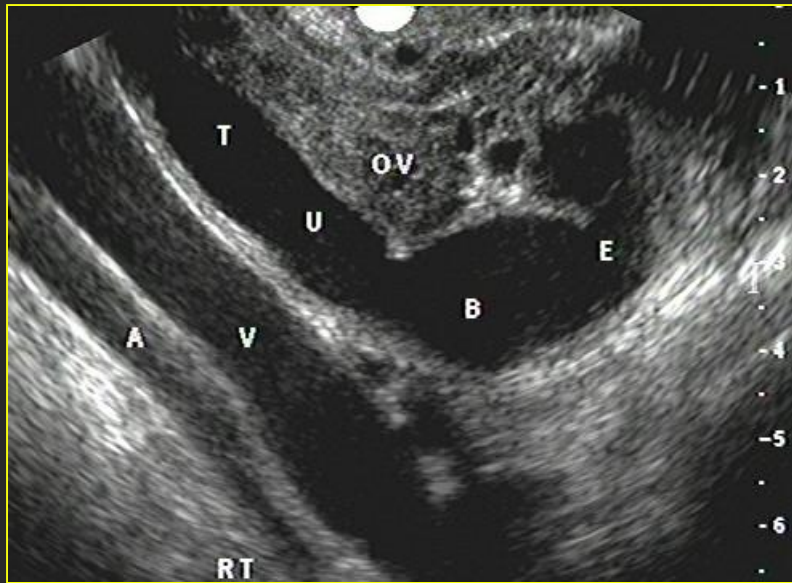
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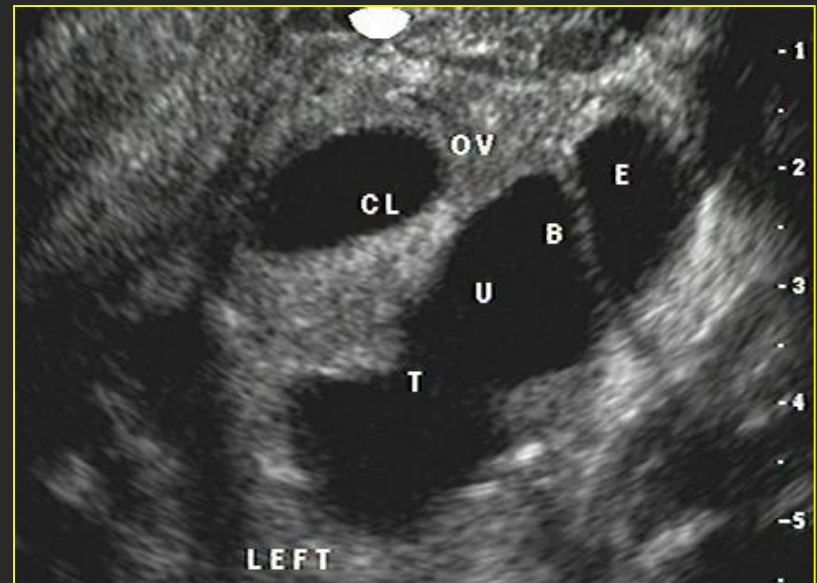
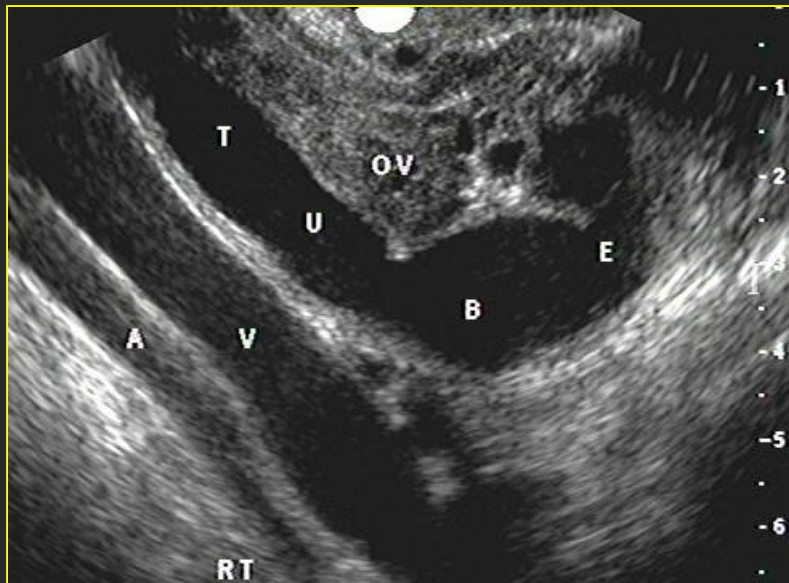
5

Echogenic free fluid (Blood) in pelvic cul de sac





Chronic bilateral hydrosalpingitis



Group 2



Normal fetal abdomen



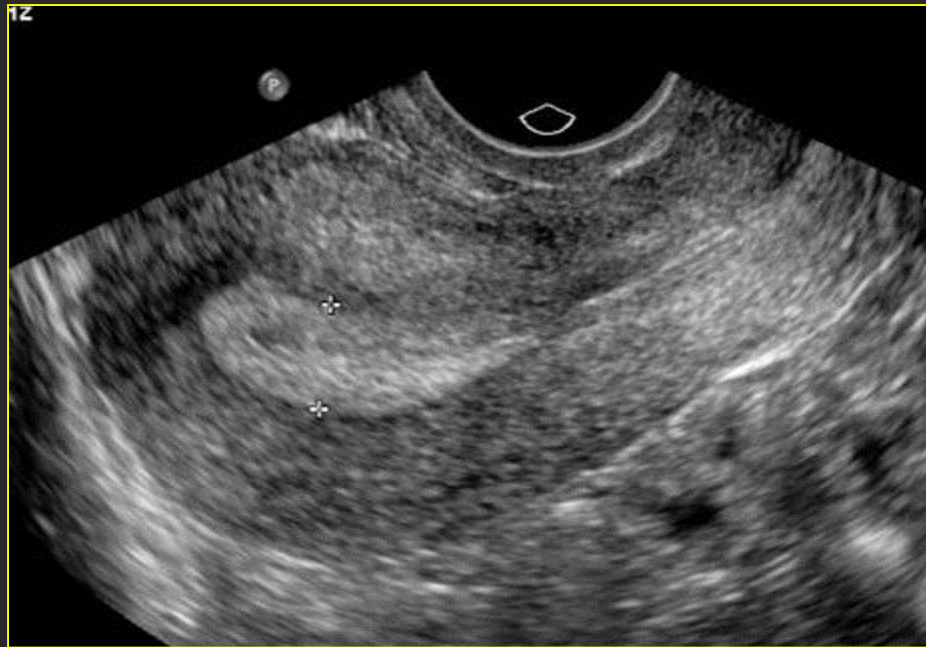


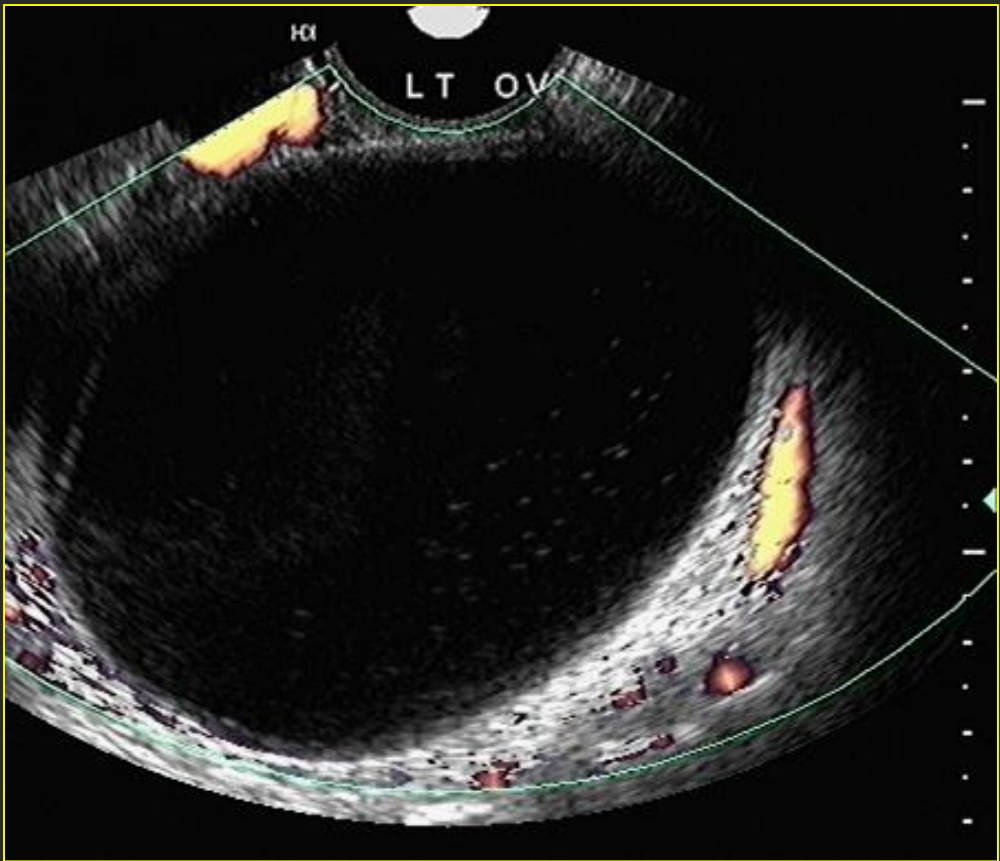
Second trimester twin pregnancy



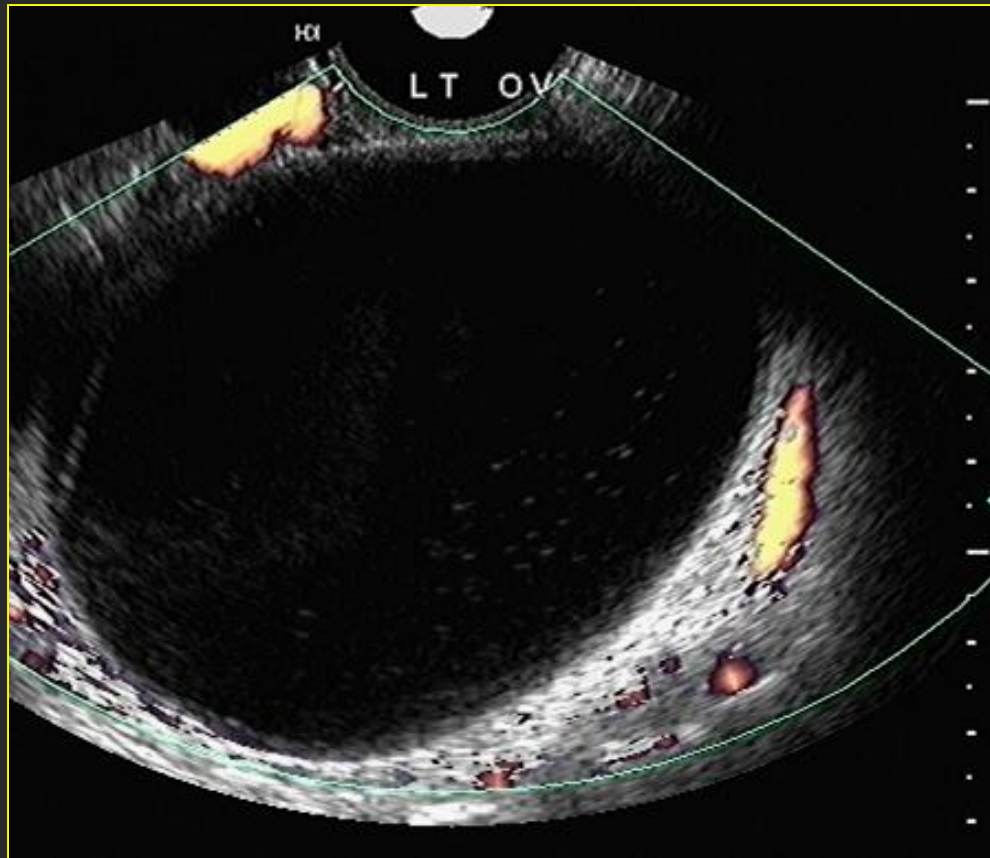


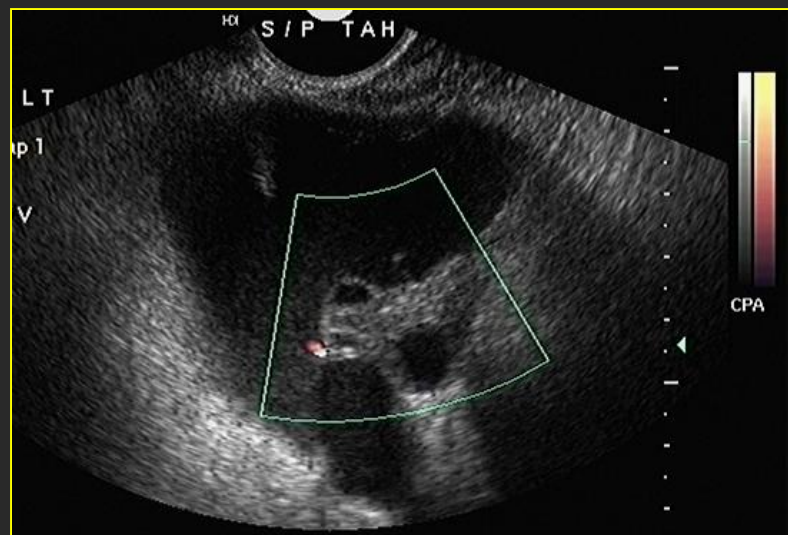
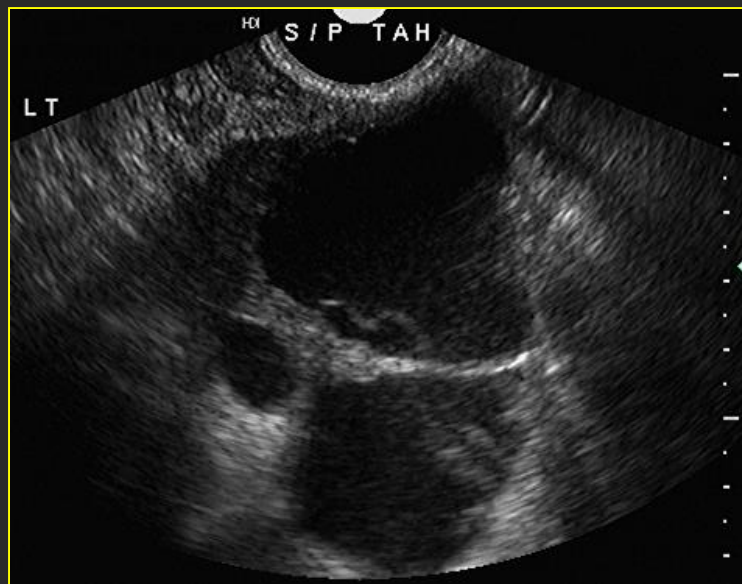
Normal Uterus with myometrium and endometrium



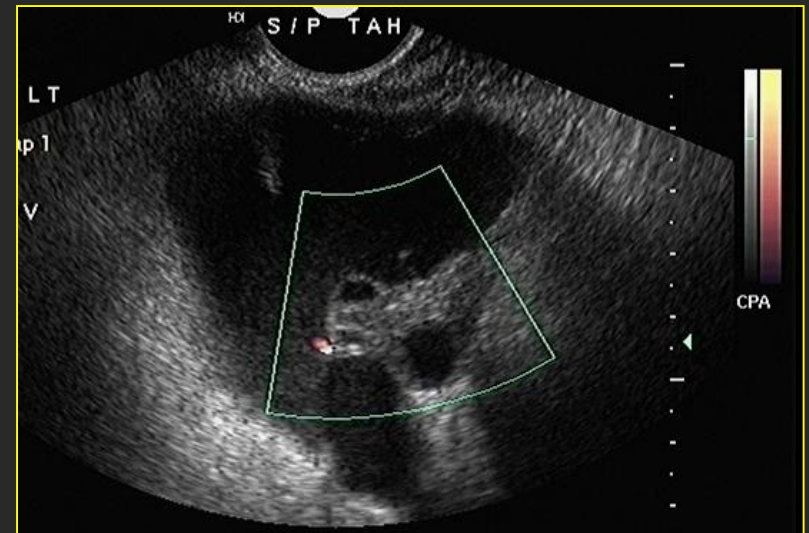
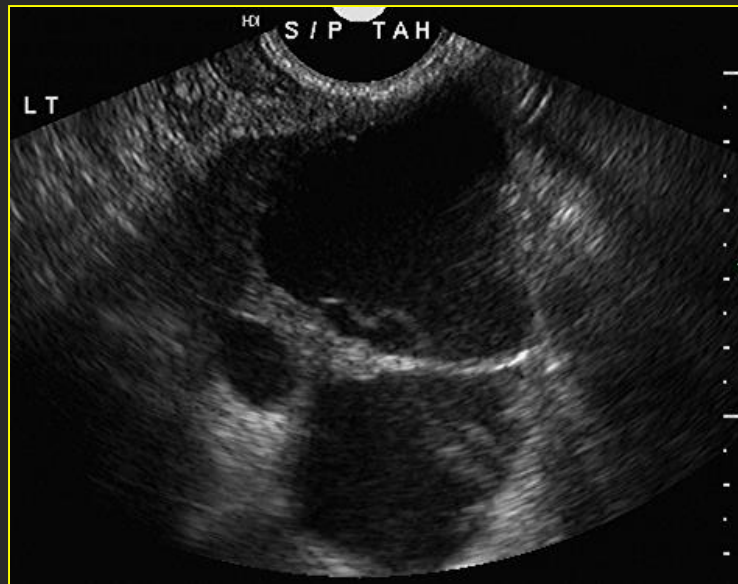


Left ovary functional or simple cyst

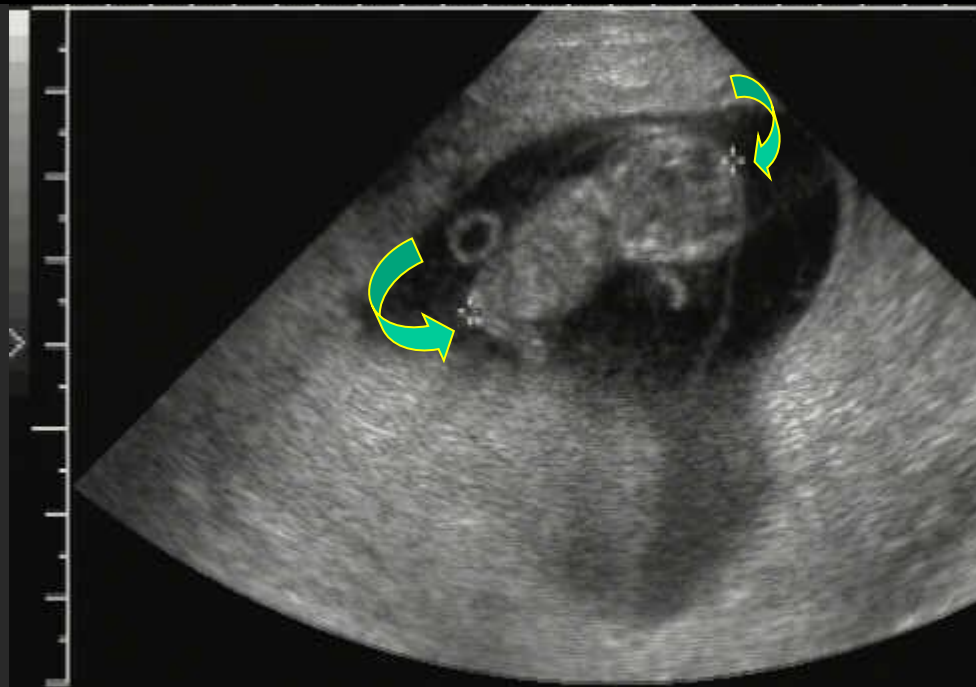




Left ovarian cystic mass: Tumor (Benign cystadenoma)



Group 3



CRL = 36.0mm MA=10W3D

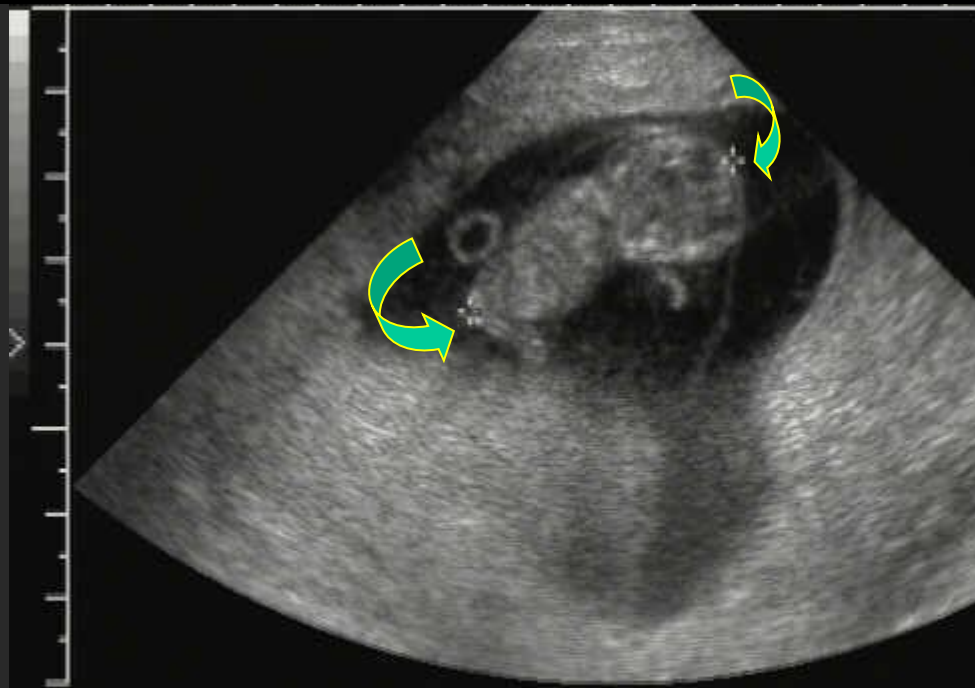
PRIOR MENU

WRKSHT

ENTER

CRL

Normal early pregnancy, CRL



CRL = 36.0mm MA = 10W3D

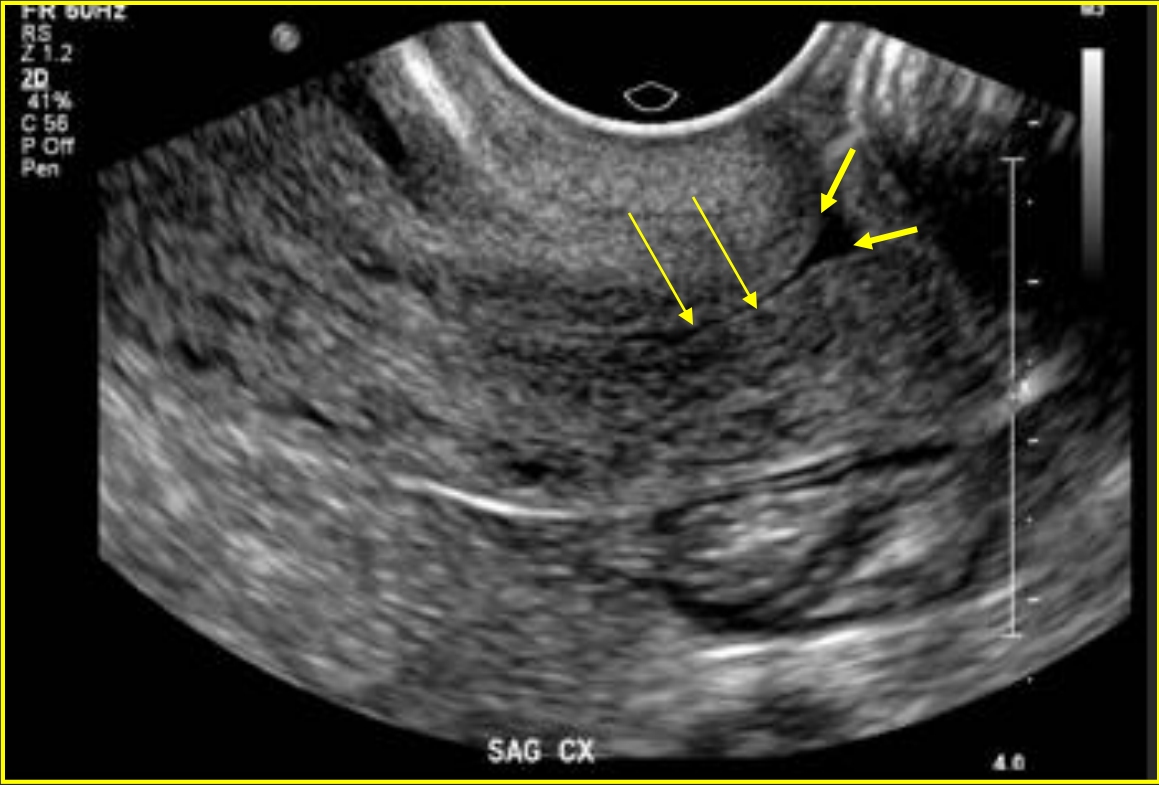
PRIOR MENU WRKSHT ENTER

CRL

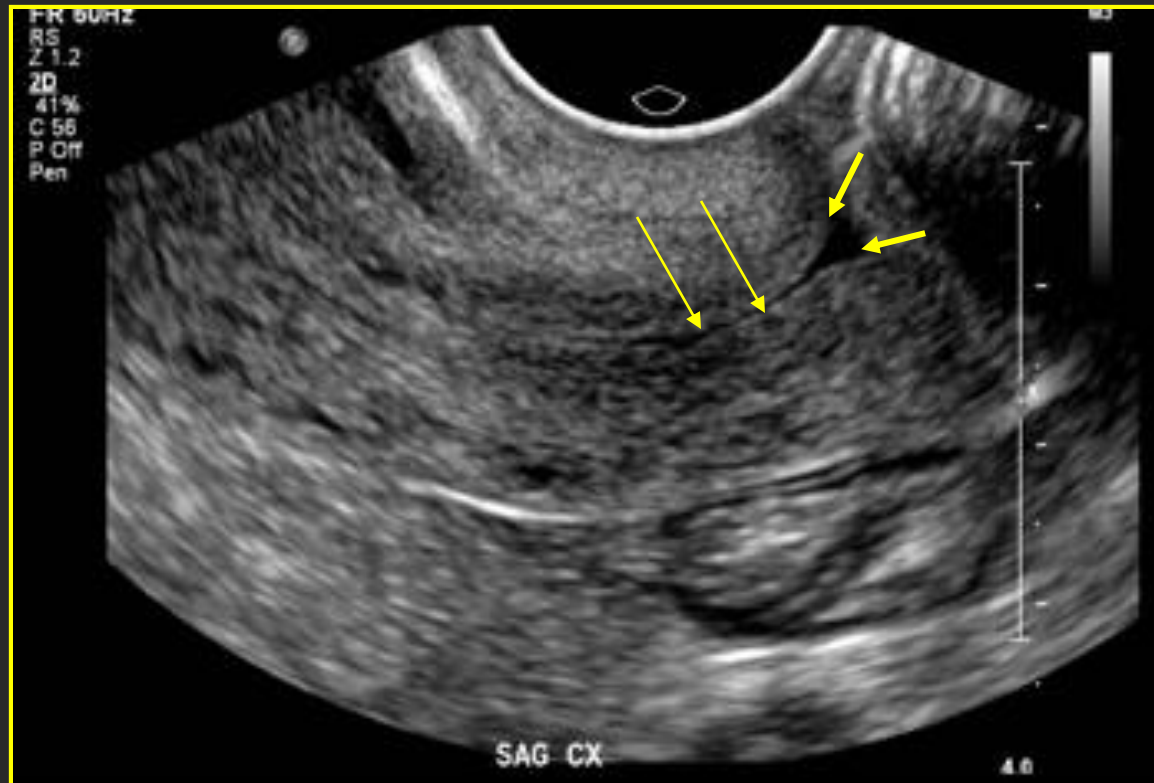


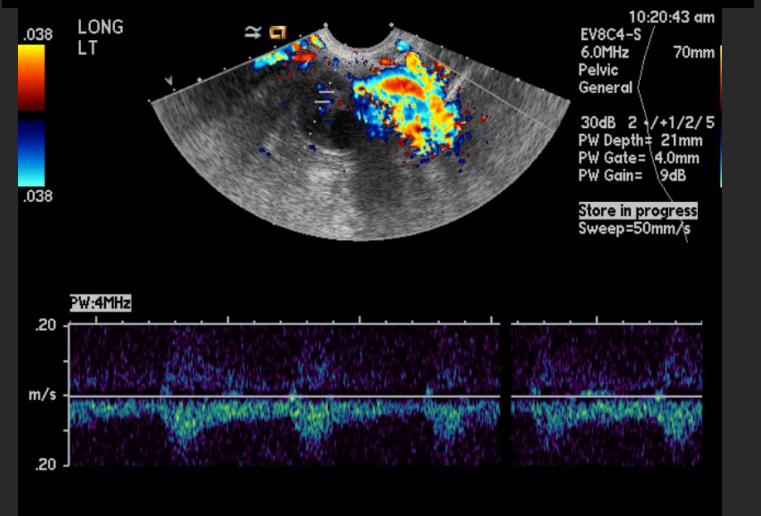
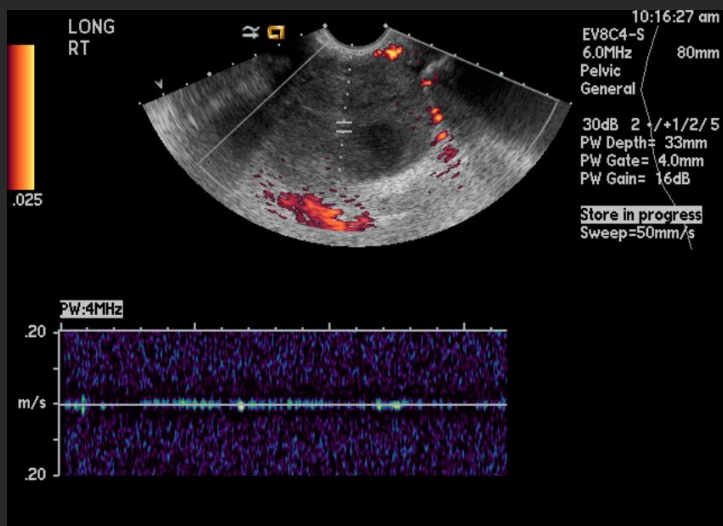
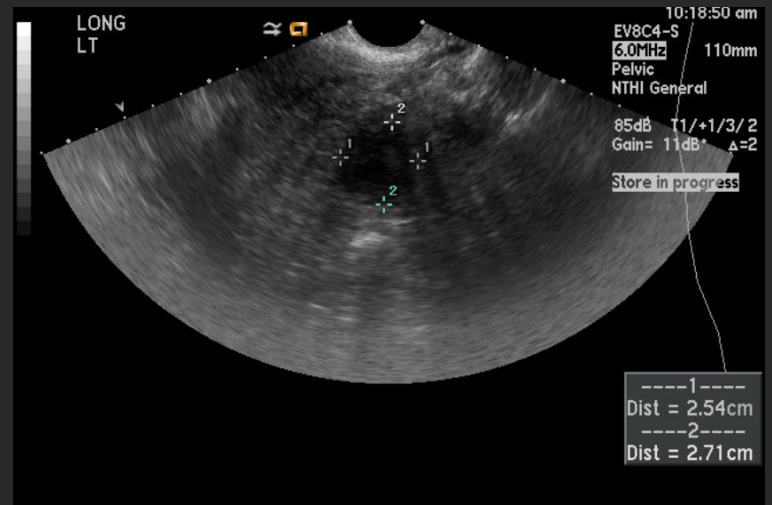
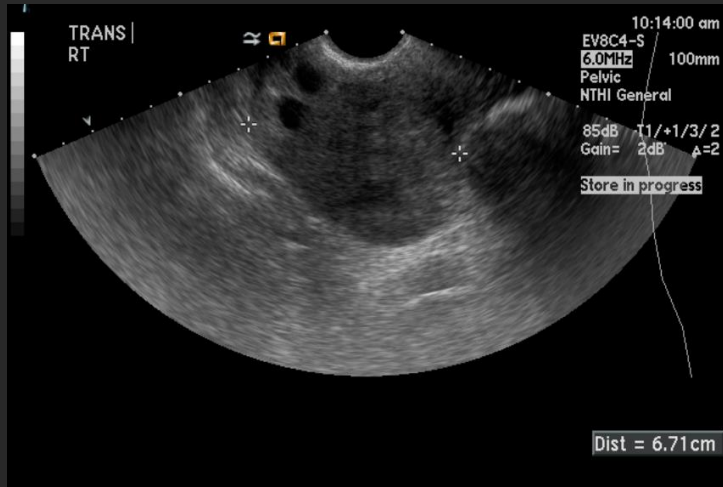
Fetal head: Hydranencephaly



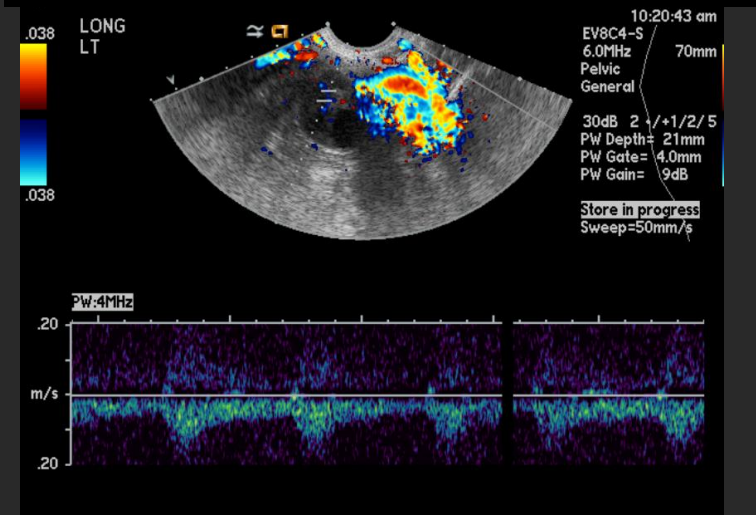
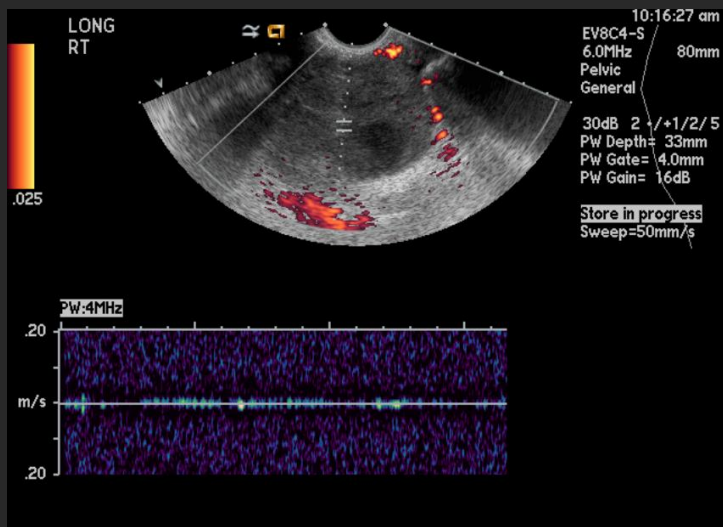
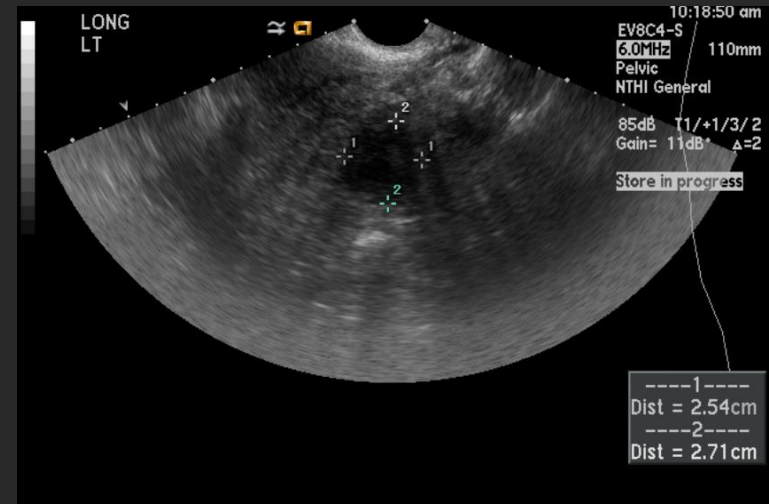
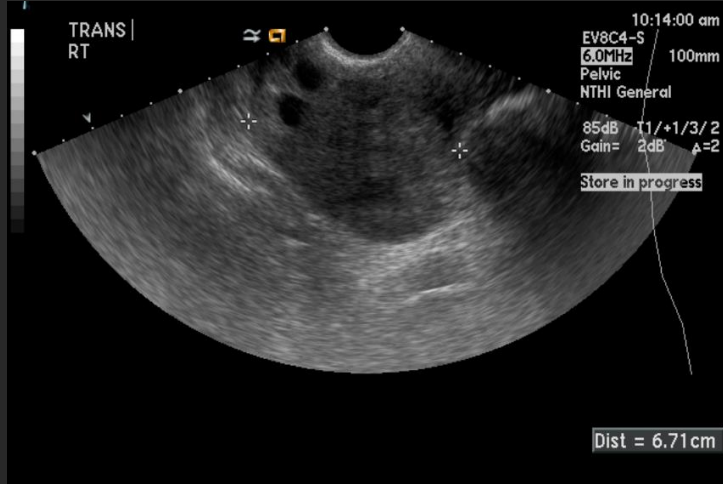


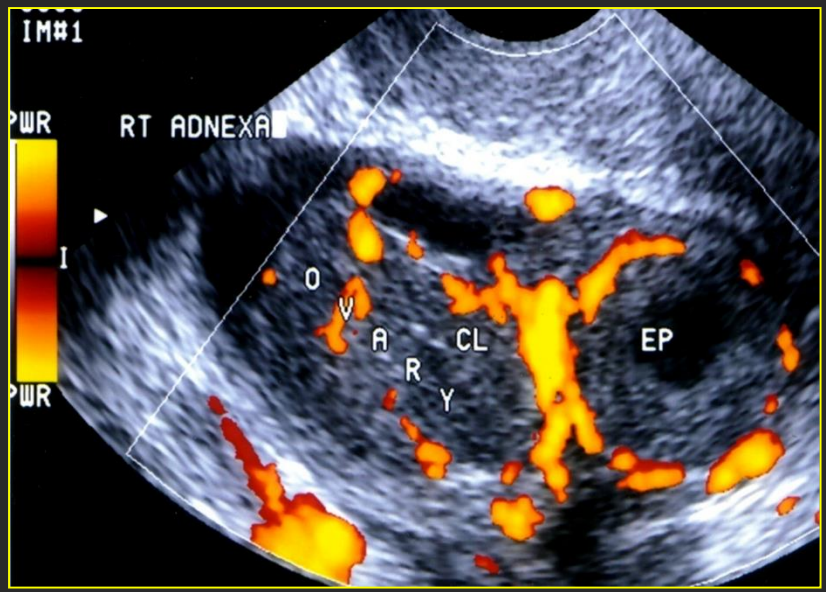
Normal Cervix



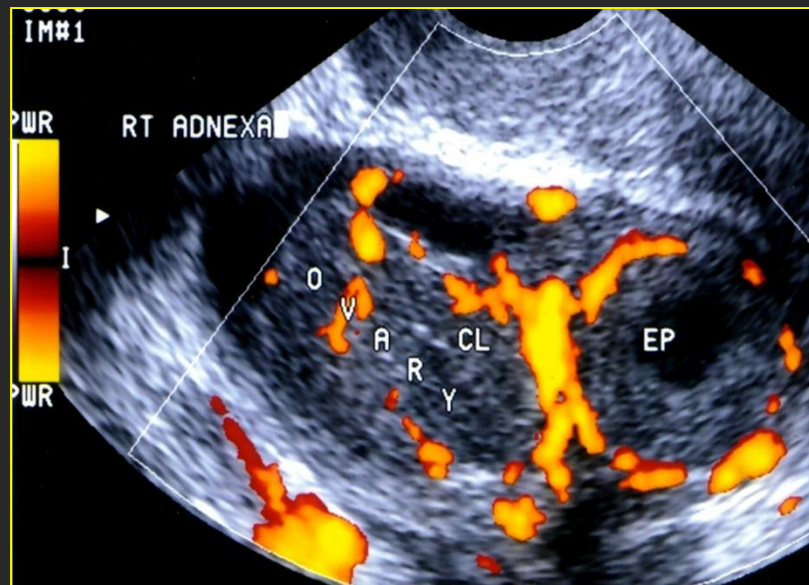


Right Ovarian torsion, normal left ovary





Right adnexal Ectopic gestation



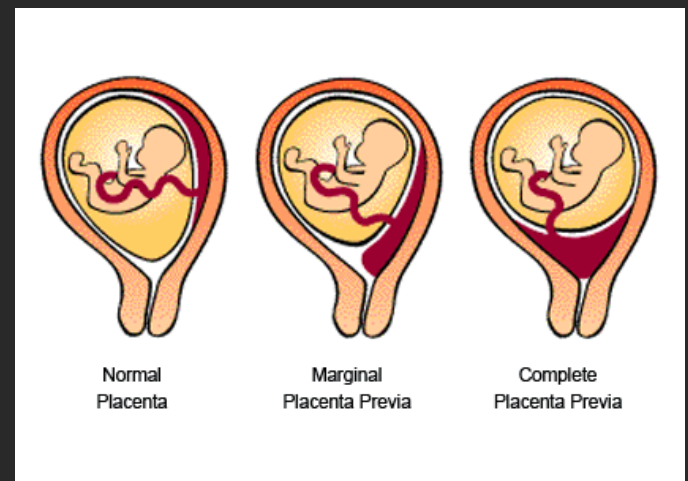
Extra cases

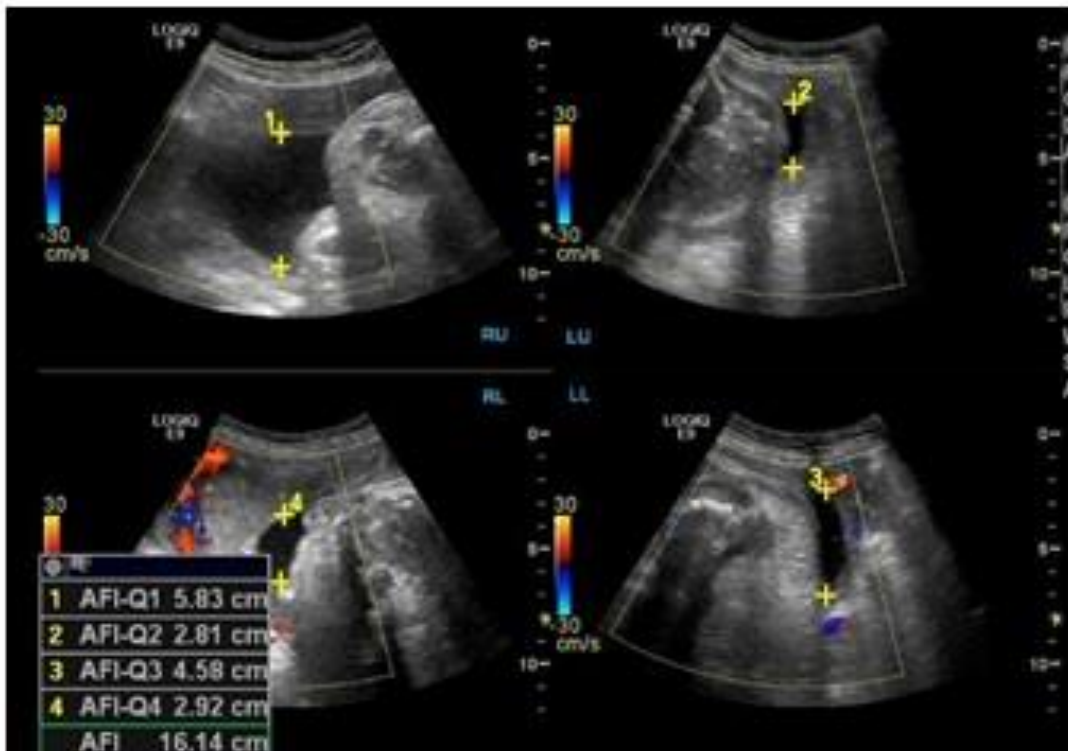


Extra case 1



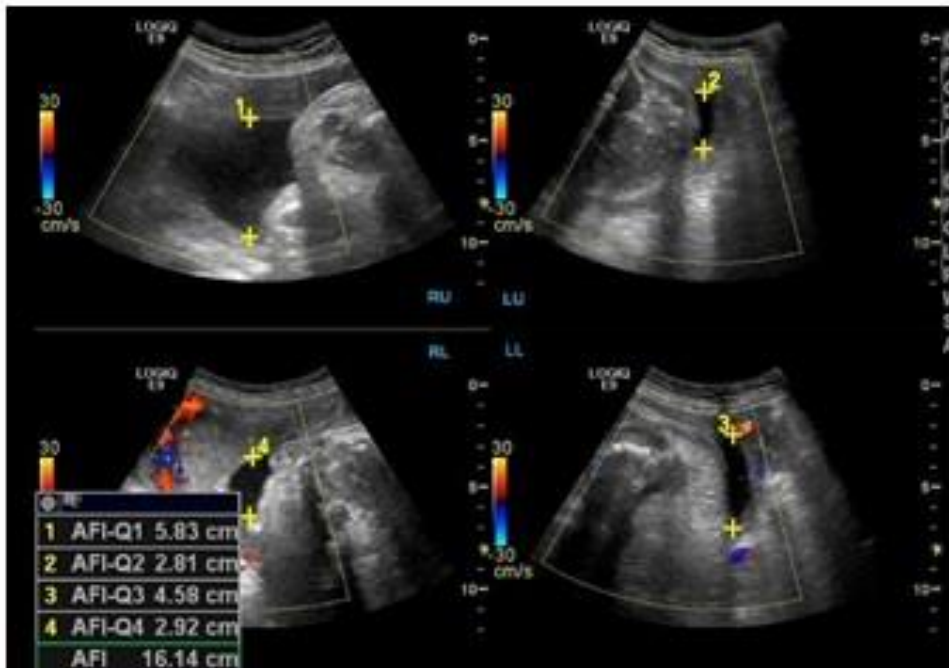
Extra case 1: Placenta previa



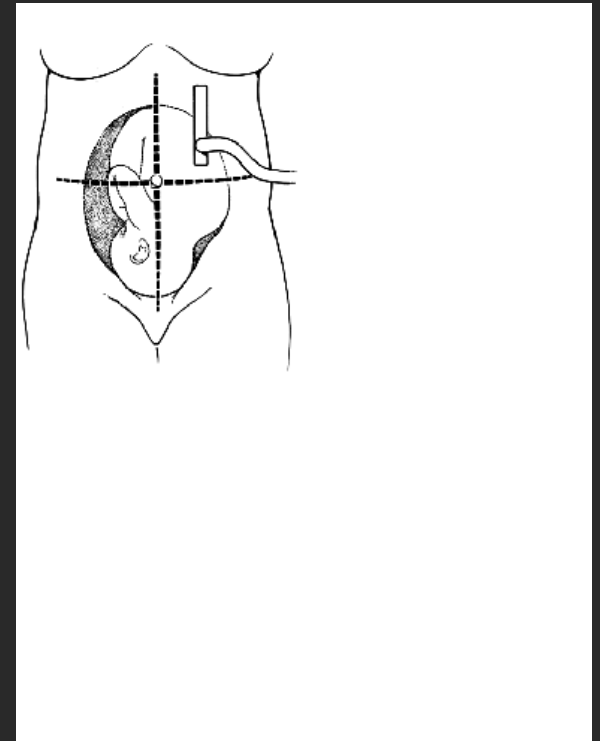


Amniotic Fluid Index

Extra case 2



Amniotic Fluid Index



Extra case 2

AFI= Amniotic fluid index

Normal 8-20 cm

Polyhydramnios

Oligohydramnios

Extra case 3:



Extra case 3:
Myometrial
perforation by IUD

