LESSON SUMMARY

FIRST TRIMESTER OBSTETRIC ULTRASOUND

PELVIC POCUS

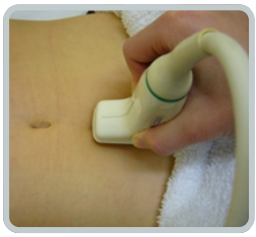
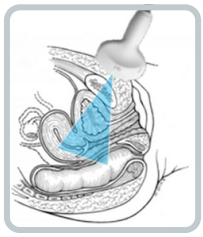
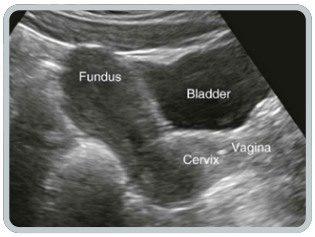
Indications for scanning

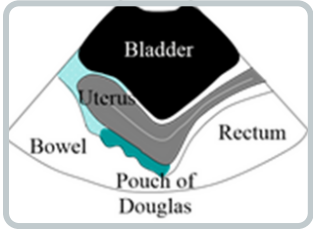
Any female: Abdominal/Pelvic pain • Amenorrhea • Abnormal vaginal bleeding • **New pregnancy diagnosis**
Pregnant: Abdominal/Pelvic pain • Amenorrhea • Abnormal vaginal bleeding • **Syncope** • **Hypotension** • **Cardiac arrest**

Transabdominal scanning techniques

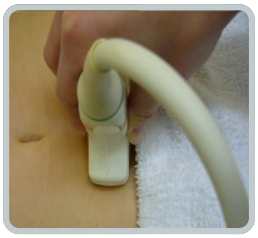
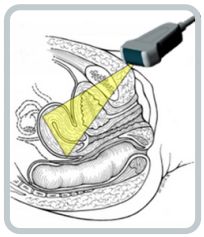
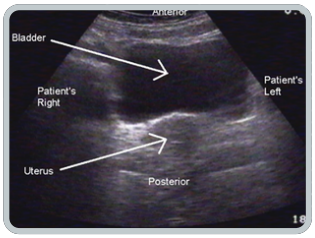
Machine settings: *Use OB setting – lower energy setting, which is safer for the pregnancy, and it auto calculates fetal heart rate and gestational age from measurements you make.* ***Probe:*** *curvilinear – low frequency, medium penetration, large footprint.*

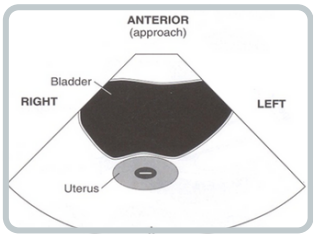
(1) Sagittal pelvis: start with patient supine, probe marker toward head, pubic bone positioned just below probe, sweep side to side, use bladder as acoustic window



(2) Transverse pelvis: flip probe marker to patient's right, fan through the pelvis, sweep side to side, use bladder as acoustic window

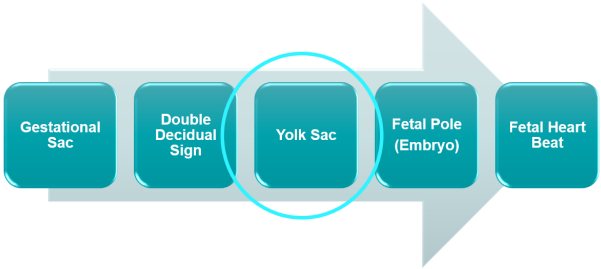


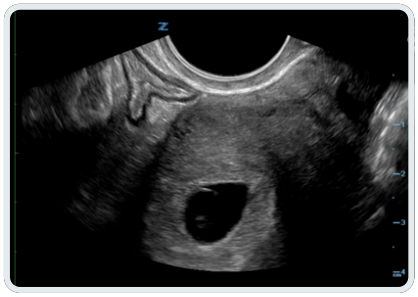
FIRST TRIMESTER OB

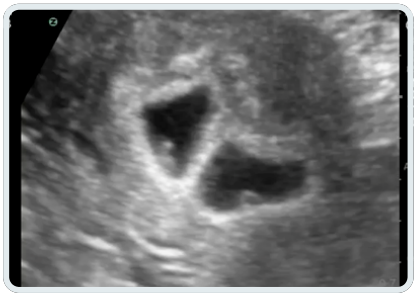
Confirming intrauterine pregnancy (IUP)

- IUP vs Ectopic – goal is to rule <u>in</u> IUP
- Look for yolk sac and any later stages of development (see next page)
- Gestational sac and double decidual sign are **not** sufficient to confirm IUP with POCUS

Sonographic fetal development

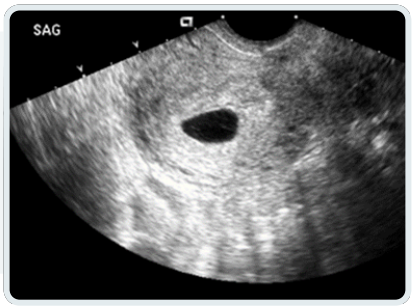



Normal IUP


Twin gestation

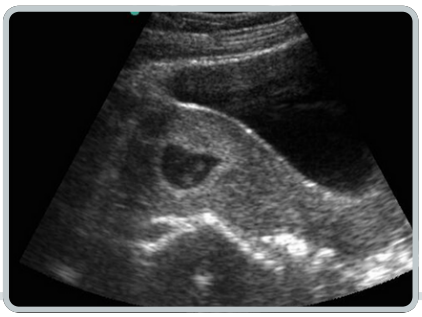
GESTATIONAL SAC

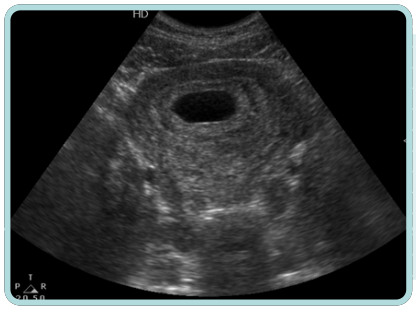
- **First sign of early pregnancy**
- Usually visible at **5 weeks**
- Round, centrally located, smooth-walled
- Simple, hypoechoic (black) sac



PSEUDOGESTATIONAL SAC

- Intra-cavitary fluid
- Occurs naturally due to hormones
- Generally irregular-shaped with pointed edges
- NOT IUP, ectopic still possible



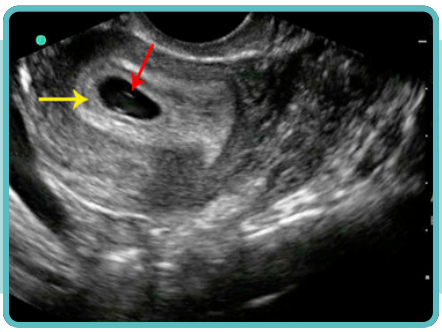


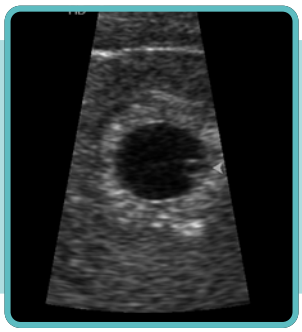
DOUBLE DECIDUAL SIGN

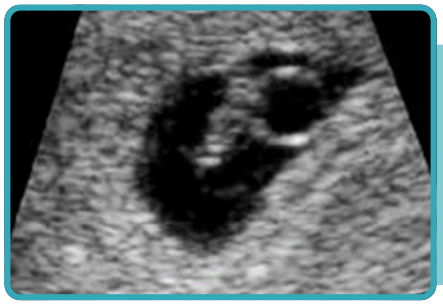
- Gestational sac surrounded by 2 hyperechoic (white-ish) rings
- May help distinguish gestational from pseudogestational sac*

YOLK SAC ("Cheerio sign")

- **First reliable sign** of IUP
- Small, round, anechoic with echogenic wall
- Usually seen by **6 weeks**
- Regresses by 12 weeks





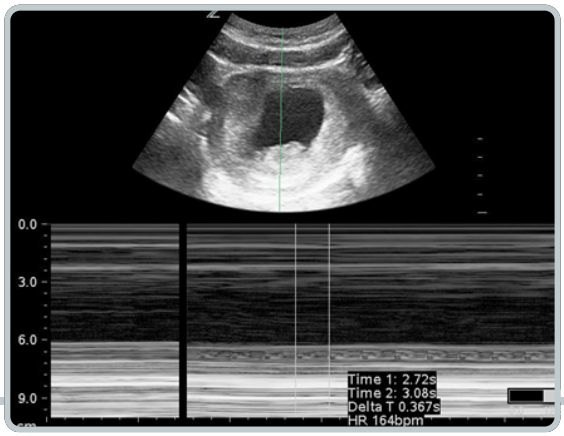


FETAL POLE

- Peanut-shaped tail
- Hyperechoic
- Adjacent to Yolk Sac
- Visible by **7-8 weeks**

FETAL HEART RATE (FHR)

- Measure for all positive IUPs
- Typically visible at approximately 7 weeks
- Use M-Mode only (lower energy setting than doppler)
- Normal FHR: 120-180 bpm



FETAL DATING: Measuring Gestational Age (GA)

Machine can auto-calculate GA from the following measurements

Trimester 1:

Crown Rump Length

- Earliest ultrasound method to measure GA
- Most accurate assessment of GA in 1st trimester
  - Best performed at 6-8 weeks of pregnancy
  - Accuracy: +/- 3-5 days
- Find fetus in long axis, and measure from tip of the head to the rump in longest axis; don't include yolk sac or extremities

Trimester 2:

Biparietal diameter (BPD) – Axial cut of baby's head

- Leading edge technique: measure from OUTSIDE proximal wall to INSIDE of distal wall
- Central white line = falx cerebri
- Black, hypoechoic, symmetric structure along central white line = thalamus

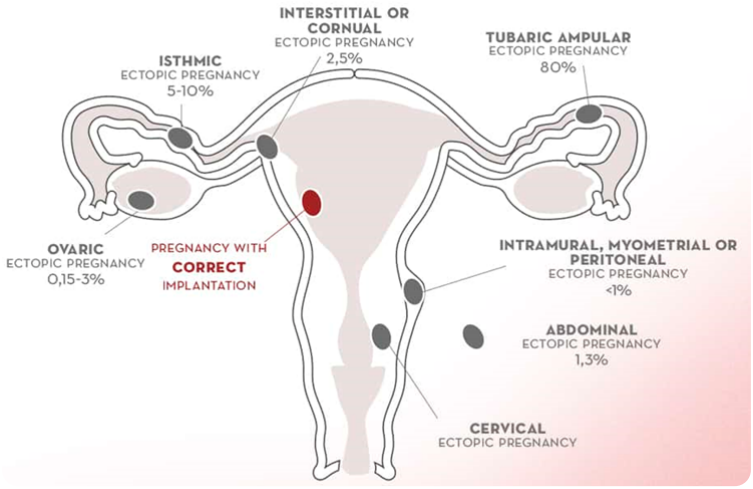
Head circumference (HC) – Axial cut of baby's head (same image obtained for BPD), but instead of measuring across the skull, measure around the skull

Femur length (FL) – Find femur in longest axis and measure end to end

Ectopic Pregnancy

Life-threatening, can't miss diagnosis!

- Pregnancy located anywhere outside of normal uterine implantation.
  - Risk factors: pelvic inflammatory disease (PID), prior ectopic pregnancy, IVF
  - 1/64 natural pregnancies are ectopic
  - 1/13 pregnancies in the ED are ectopic
- POCUS findings of ectopic pregnancy
  - +HCG with no visible IUP
  - Gestational sac/yolk sac/fetal pole OUTSIDE the uterus
  - Complex adnexal mass
  - Free fluid in peritoneum



(+) Pregnancy test – IUP = Ectopic

(+) Pregnancy test – IUP + (+) FAST = Rupturing Ectopic

- In any patient with abdominal pain, positive free fluid in the abdomen by ultrasound and positive pregnancy test should be considered an ectopic pregnancy with immediate consult obstetrics, until proven otherwise
- Free fluid in the abdomen, specifically in Morrison's Pouch (right upper quadrant), predicts need for operative intervention in ectopic pregnancy
- Discriminary threshold for trans-abdominal IUP: ~5 weeks (hcg 5000)

Interstitial ectopic pregnancy – fetus implants at junction between fallopian tube and the uterus; can be confusing, as it can look like it is almost in the correct location

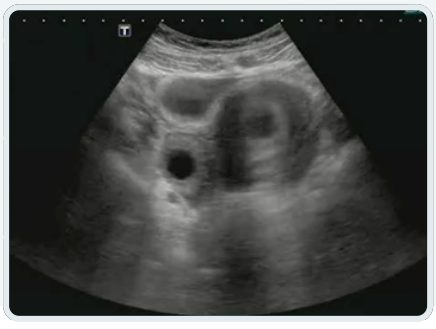
Endomyometrial mantle – measured to diagnose interstitial ectopic pregnancy

- The thickness of the myometrium at its most narrow part
- < 8mm: consider ectopic pregnancy, regardless of b-hcg

Other Pelvic Pathology

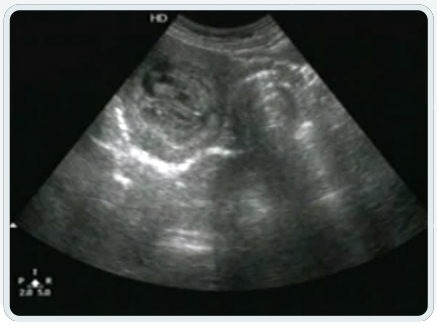
HETEROTOPIC PREGNANCY

- Twin pregnancy where one is in the uterus, other is in ectopic location
- Occurs in 1 in 4,000-30,000 natural pregnancies vs. **1 in 100 in patients undergoing REI**
- *Transvaginal US recommended for patients who have had any REI procedure, to check for possible 2nd pregnancy in ectopic location*



MOLAR PREGNANCY

- Neoplasm of placental hcg producing trophoblast cells
- Risks:
  - Advanced age
  - Prior molar pregnancies
- POCUS findings:
  - Complex intrauterine mass
  - Grape-like cysts
  - No IUP



SUBCHORIONIC HEMORRHAGE

- Bleeding underneath the chorion membranes enclosing the fetus in the uterus (within myometrium)
- Most common cause of 1st trimester vaginal bleeding
- Slightly higher risk of miscarriage