Common Abnormalities Encountered in the PRC Limited OB Sonogram

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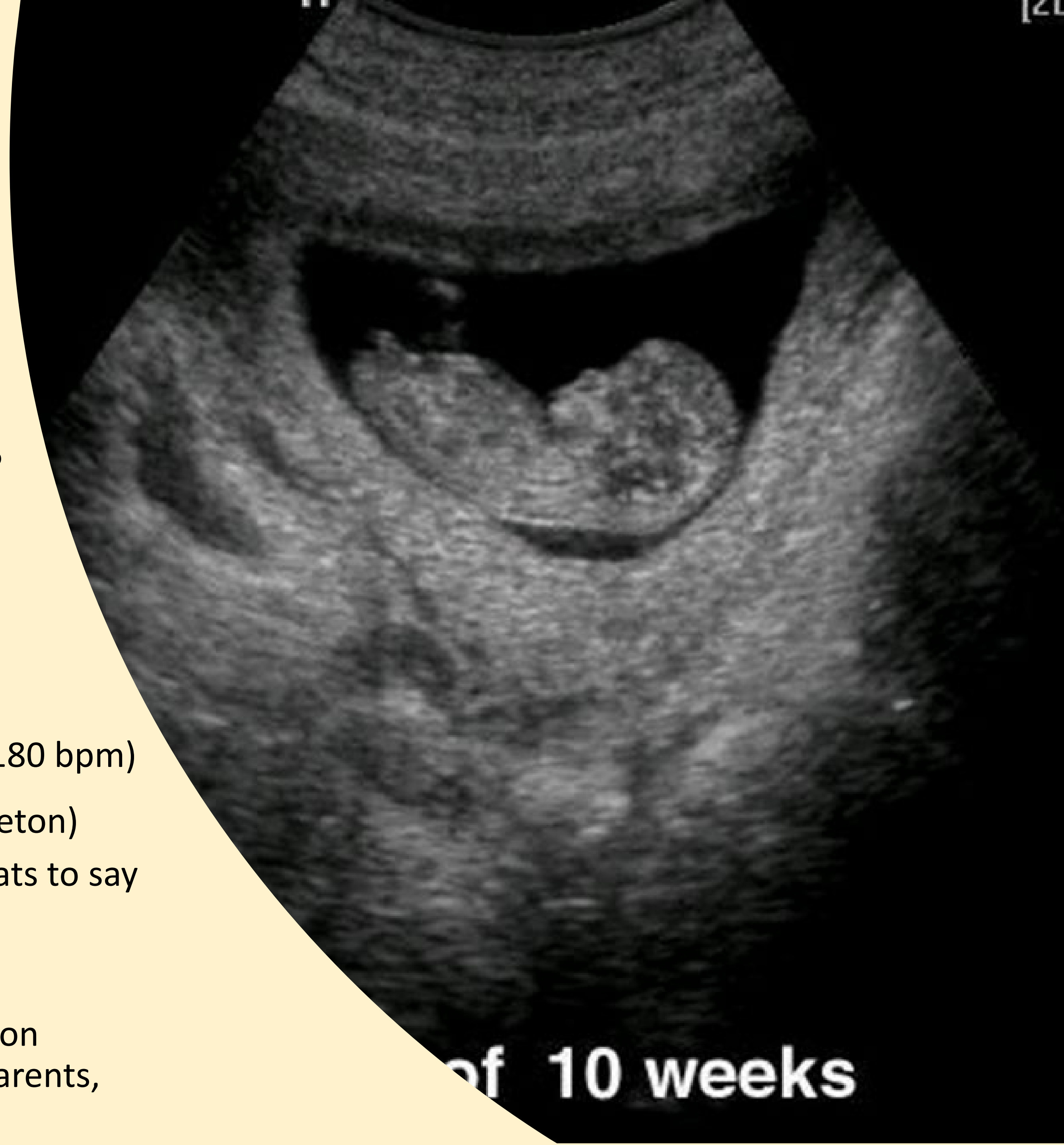
Disclaimer:

- The protocols and policies described in this presentation are representative of common policies in many pregnancy resource centers but are not prescriptive.
- The medical director and board of each pregnancy resource center has discretion and authority to determine the procedures for handling patients with unusual situations or ultrasound findings for their center.
- All procedures and content within this presentation meet professional standards and NIFLA guidelines.

Goals of the PRC Limited OB Sonogram:

- **Dating**
  - What is the gestational age/What's the due date?
- **Confirm Intra-uterine Pregnancy (IUP)**
  - Is there a pregnancy inside the uterus?
- **Confirm Fetal Heartbeat**
  - Is there a heartbeat?
    - If so, what is the heartrate? (Normal = 100-180 bpm)
- **Document number of gestations** (multiple vs singleton)
  - Must see multiple embryos/fetuses with heartbeats to say for certain that multiple pregnancy is present
- **Familial Factors**
  - Studies have shown that seeing the unborn baby on ultrasound increases parental bonding for both parents, even in the first trimester.



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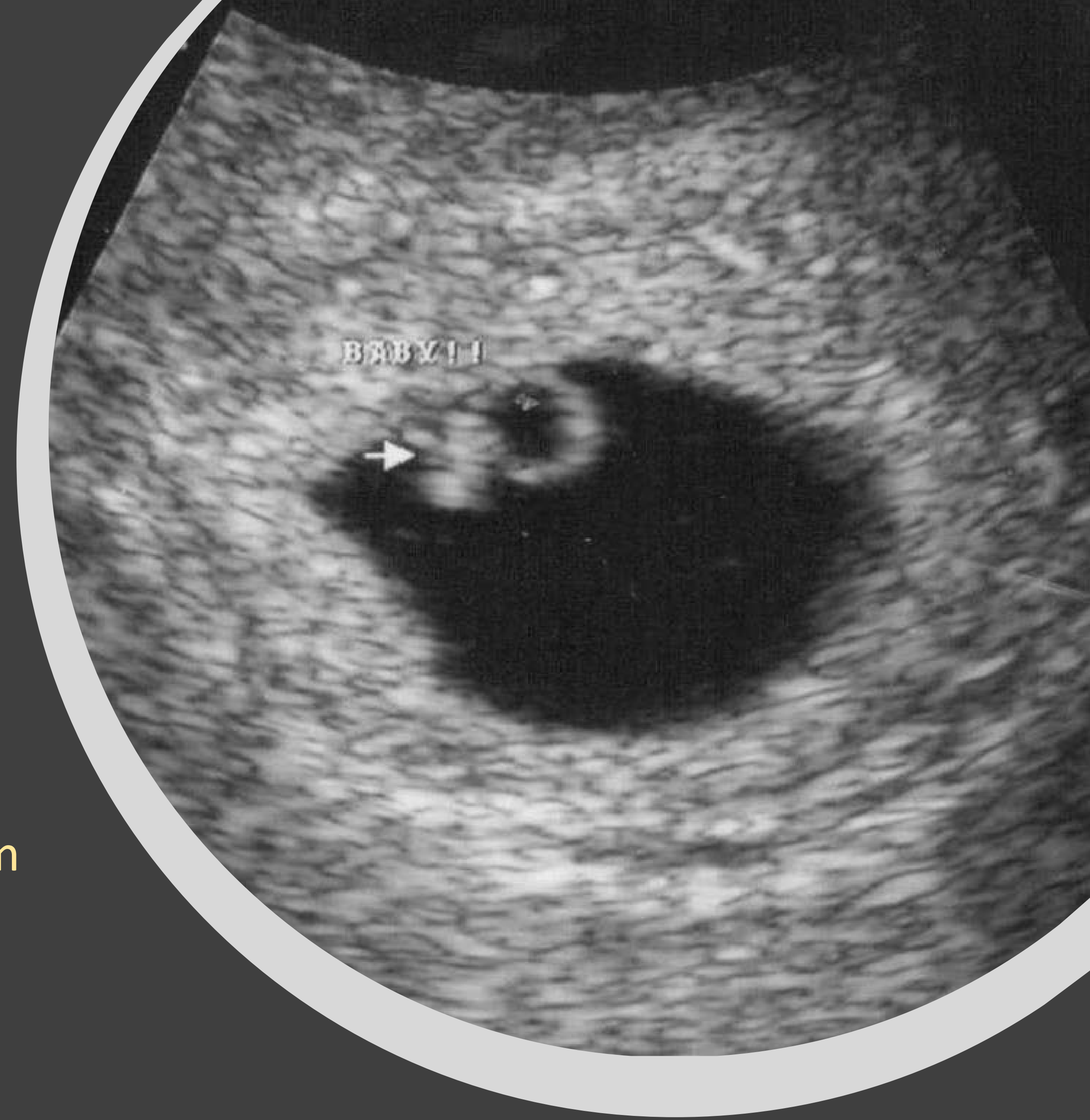
Please Note:

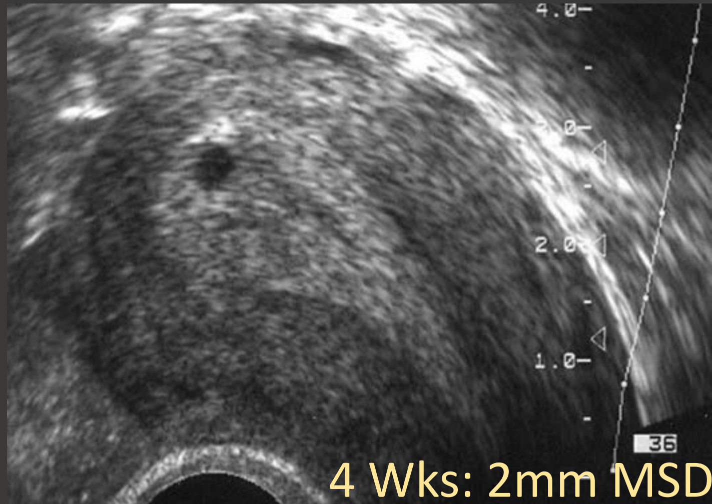
- **Diagnosis of anomalies is NOT a goal of the PRC limited OB sonogram!**
- However, it's important to recognize common appearances that should raise "red flags" and cause you to:
  - Contact your medical director
  - Recommend to the patient that she be alert for certain symptoms
  - Seek immediate medical care

First trimester: Expected appearance

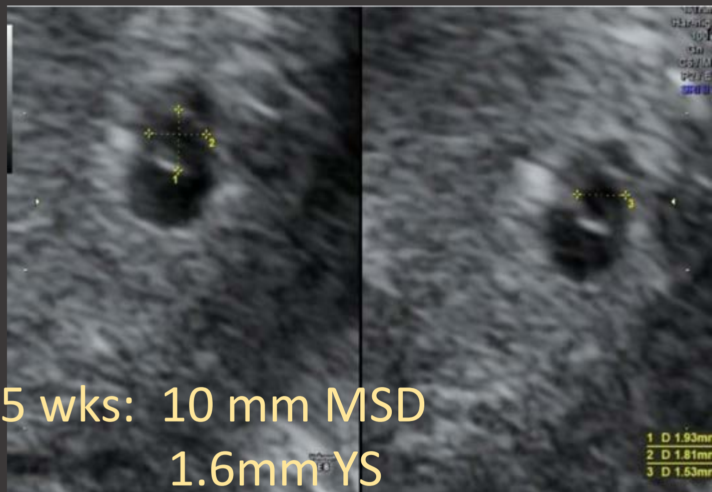
- Typically schedule sonogram after client is at least 6 weeks gestational age based on LMP.
  - May vary based on PRC policy & medical director/board
  - Often, clients' dates are not accurate…
- **At 6 weeks, expect to see:**
  - Mean gestational sac diameter of about 14 mm
  - Embryonic pole/Crown rump length of about 3 mm
  - Embryonic heart rate between 110 & 120 bpm (>100)
  - Yolk sac—round, about 3 mm in diameter
  - Cystic structure on 1 maternal ovary = Corpus luteum
    - Often complex/contains echoes



First Trimester Expectations:



4 Wks: 2mm MSD



5 wks: 10 mm MSD
1.6mm YS

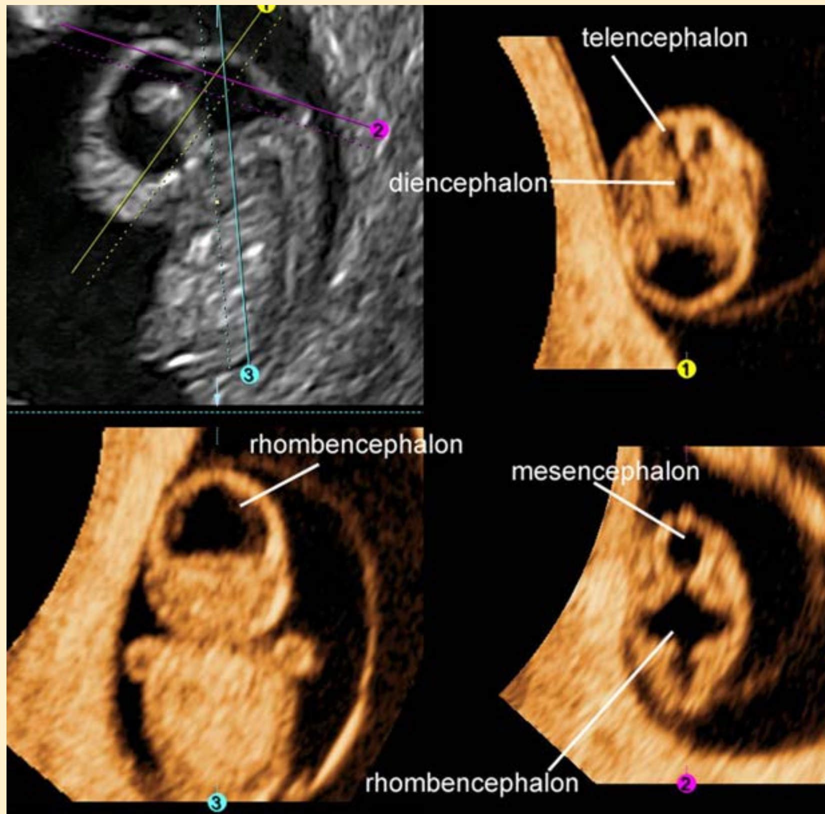
Week	Appearance	Image	MSD	CRL	YS	FHR
6	Stick w/Heartbeat		14 mm	3 mm	3 mm	108 bpm
7	Tadpole		20 mm	8 mm	4 mm	131 bpm
8	Teddy bear		27 mm	14 mm	4 mm	156 bpm
9	Teddy bear		34 mm	21 mm	5 mm	173 bpm
10	Little human		41 mm	29 mm	5 mm	169 bpm
11	Little human		48 mm	41 mm	5 mm	144 bpm
12	Little human		54 mm	52 mm	5 mm	140 bpm

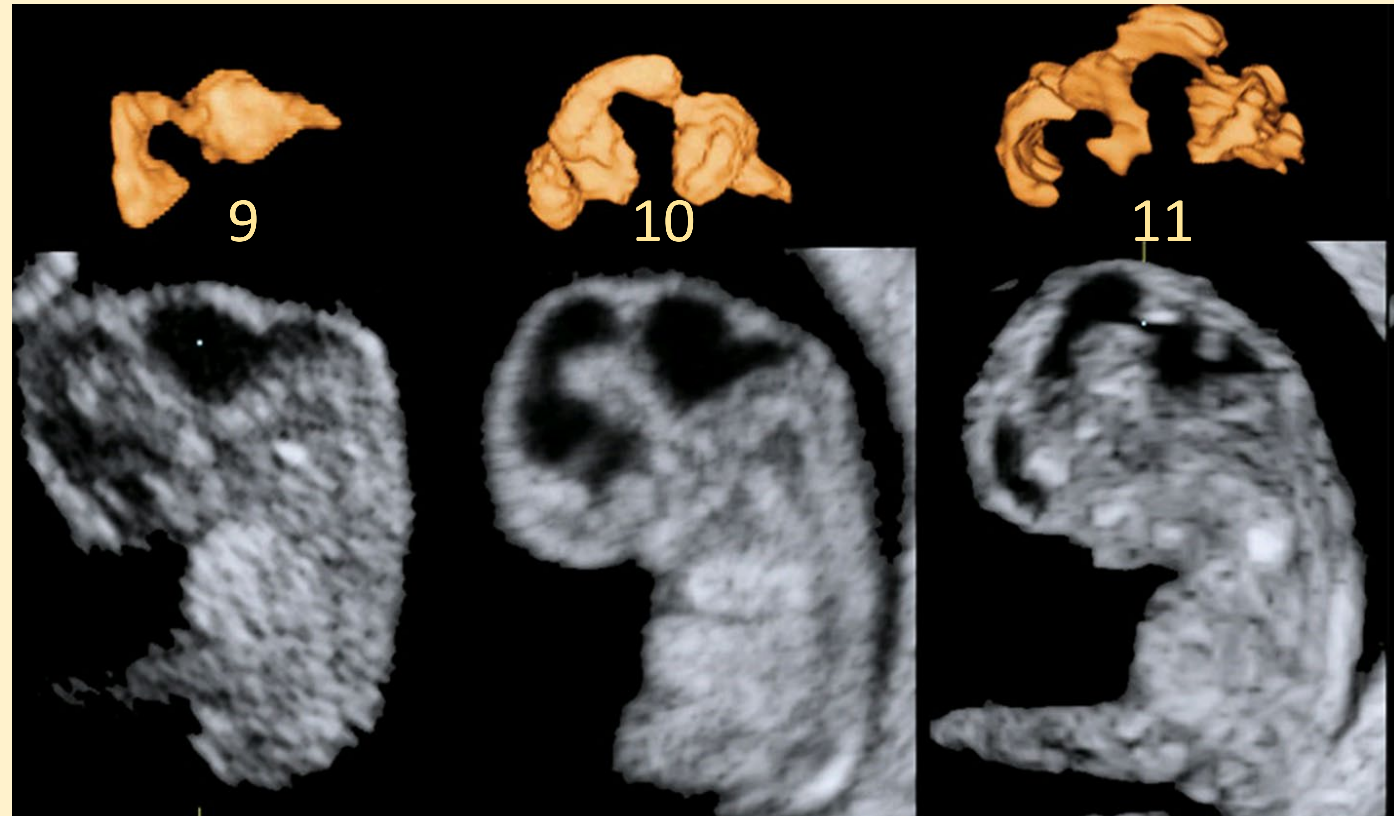
First Trimester Pitfalls

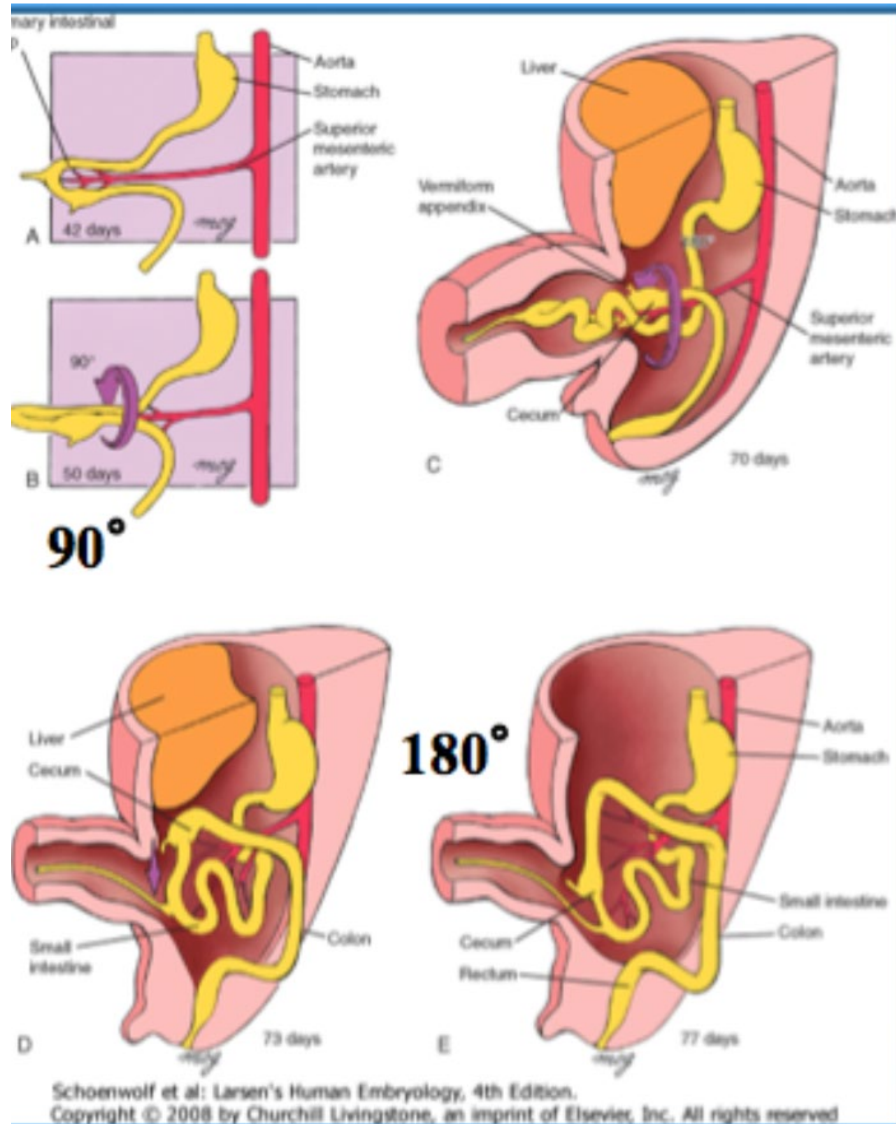
Normal Anatomy That May Be Mistaken For Pathology

Rhomboid Fossa

- Cystic structure in the fetal brain seen between 8 and 11 weeks GA.
- Will become the 4th ventricle & cerebral aqueduct
- Looks relatively large, do not mistake for pathology

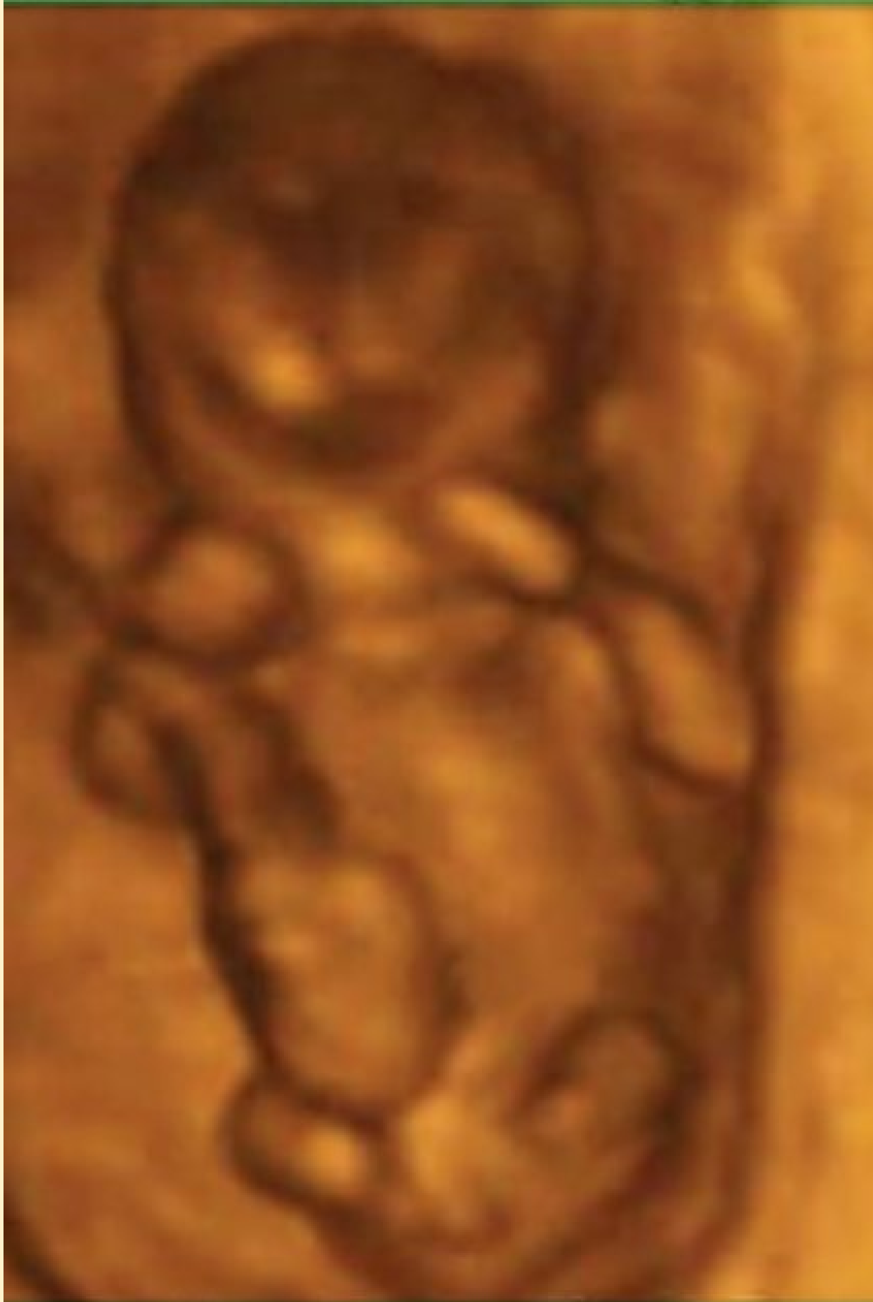


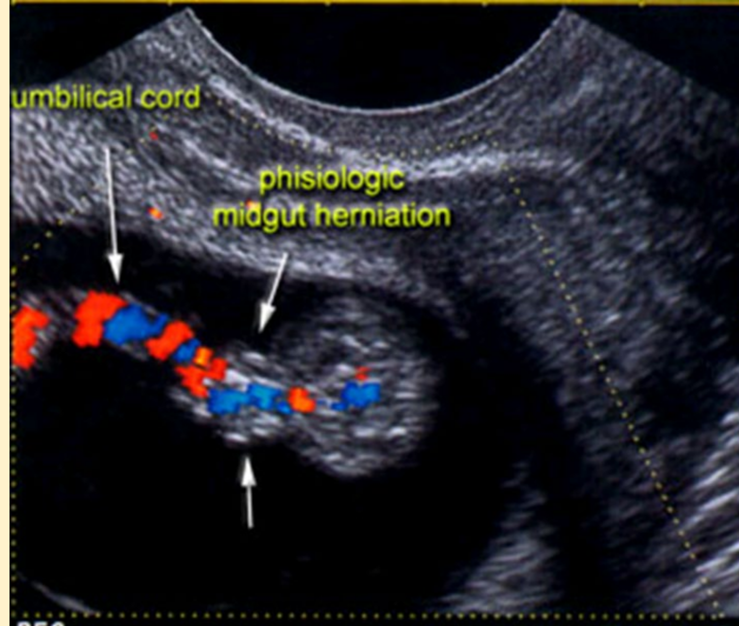


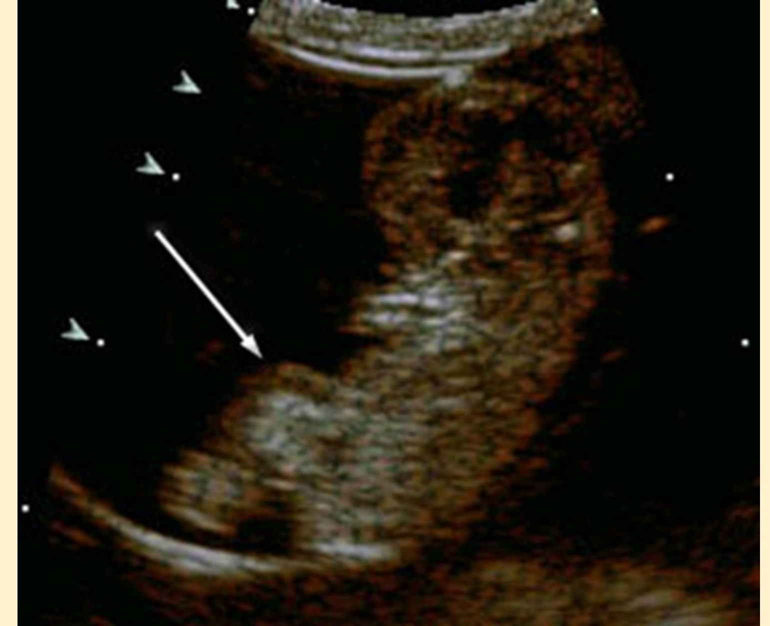


Physiologic Gut Herniation

- Between weeks 8 and 11 the midgut protrudes into the base of the umbilical cord due to rapid growth of abdominal viscera increasing intra-abdominal pressure.
- The bowel rotates before re-entering the abdominal cavity at the end of the 11th week, placing the small bowel posterior to the transverse colon and the appendix on the right side of the abdomen.
- It's important to recognize this as a normal phenomenon, not an omphalocele.



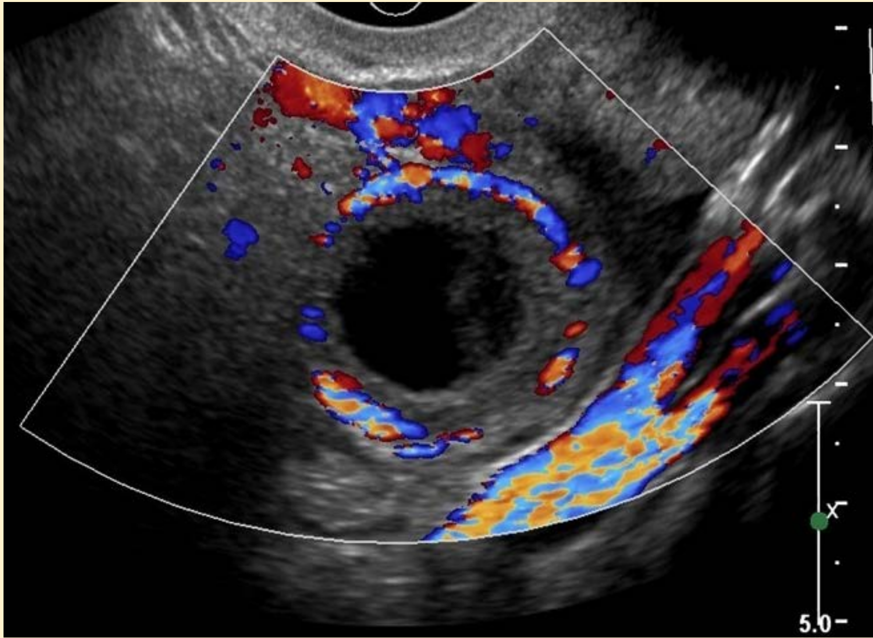


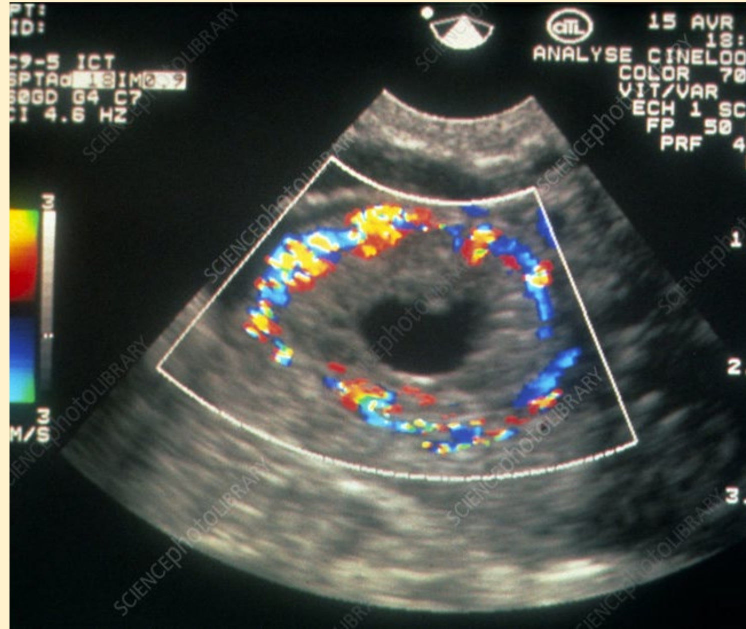


Physiologic Gut Herniation

Corpus luteum of pregnancy

- Each month, the follicle that releases the oocyte at ovulation undergoes luteinization to form the corpus luteum to support the endometrium during the secretory phase of the menstrual cycle.
- If fertilization occurs, the zygote secretes hCG which prevents degeneration of the corpus luteum so that progesterone and estrogen secretion continues until implantation occurs and the placenta is established.
- The corpus luteum of pregnancy should not be mistaken for an ectopic pregnancy in the presence of early IUP, when the gestational sac is too small to visualize.
  - It has a thick echogenic capsule
  - It has peripheral vascularity that can mimic “ring of fire” flow on color Doppler

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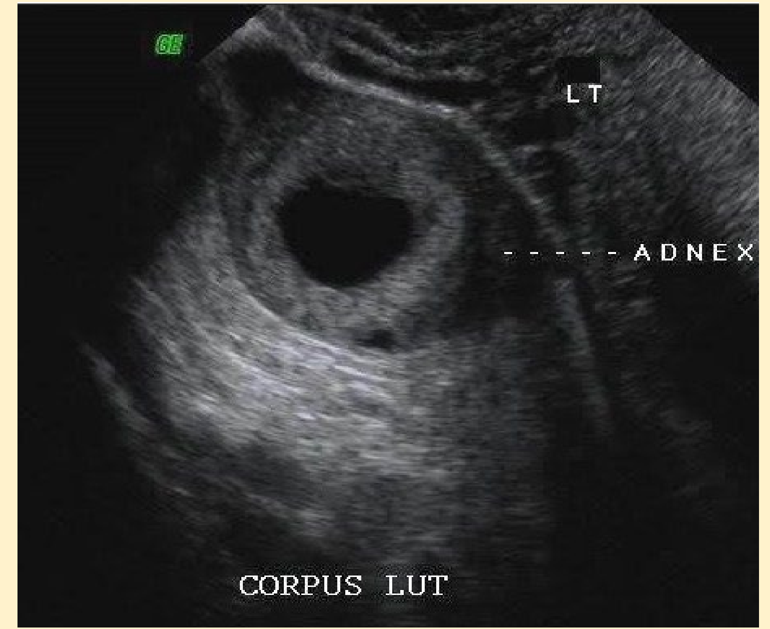
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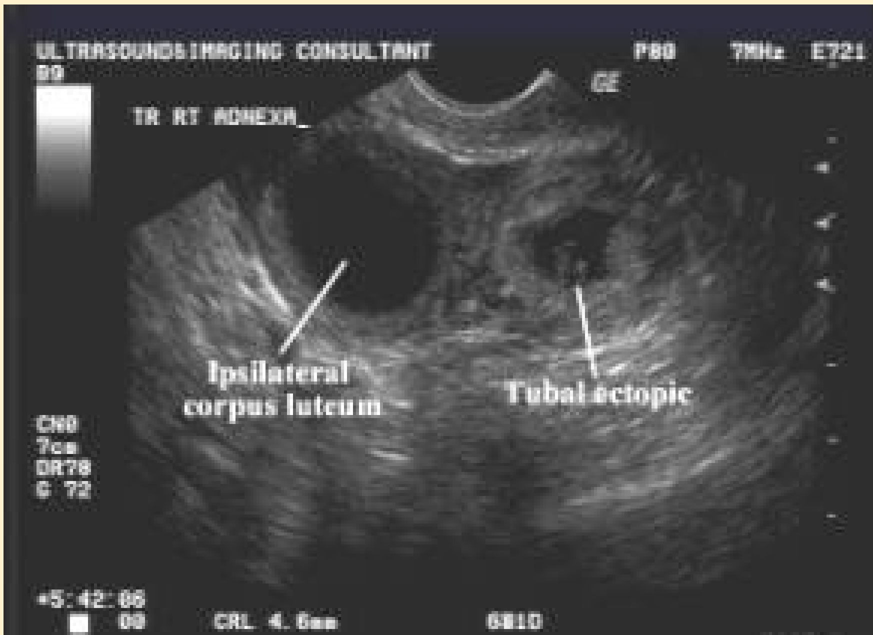
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P80
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Ipsilateral corpus luteum
Tubal ectopic
CN0
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DR78
G 72
CRL 4.6mm

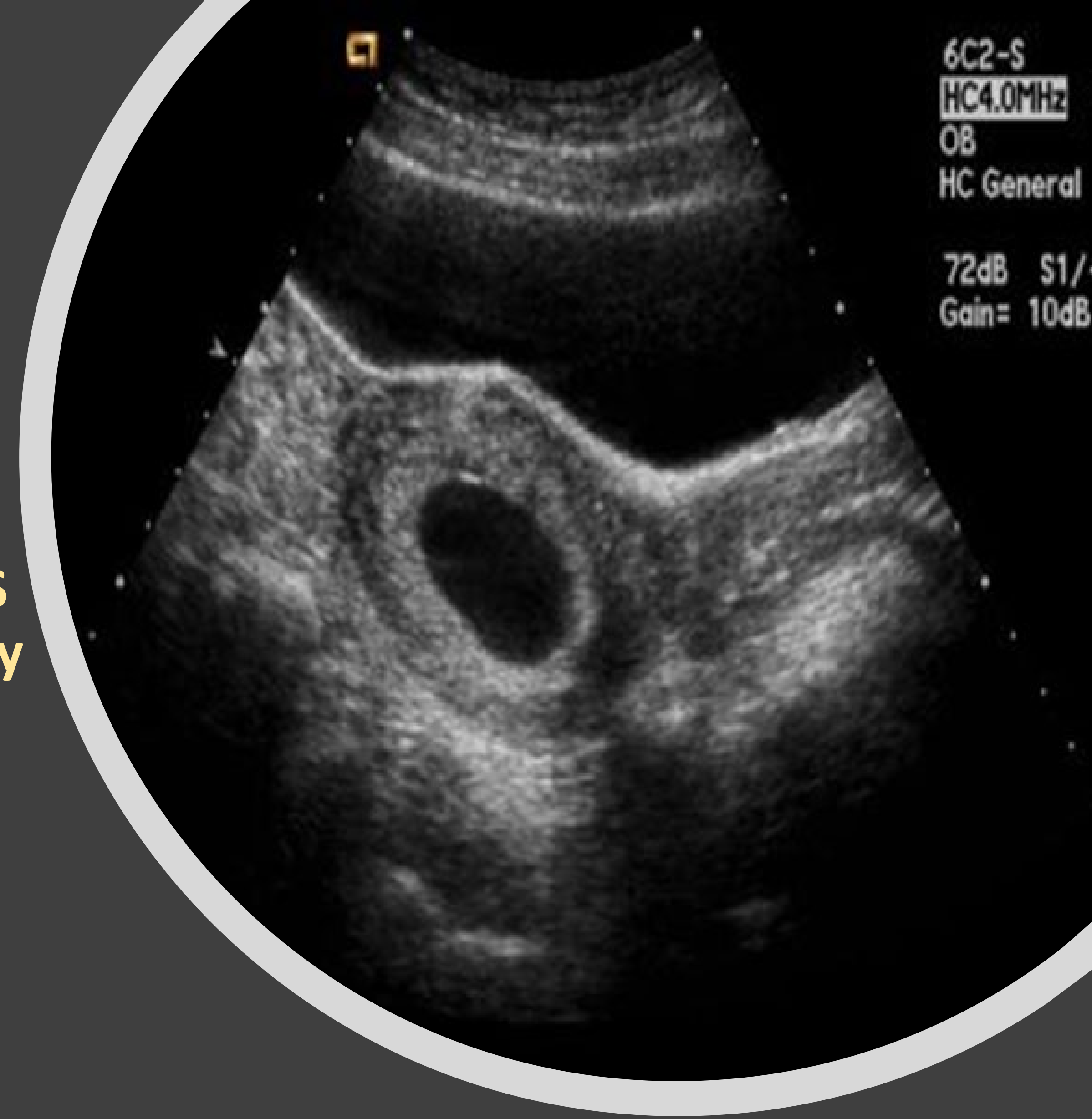
corpus luteum
granulosa lutein
human ovary
medulla
cortex
corpus albicans
ca
Corpus Luteum of Pregnancy

Pathology Commonly Encountered in the First Trimester

Some things are urgent; most just need follow up by a physician

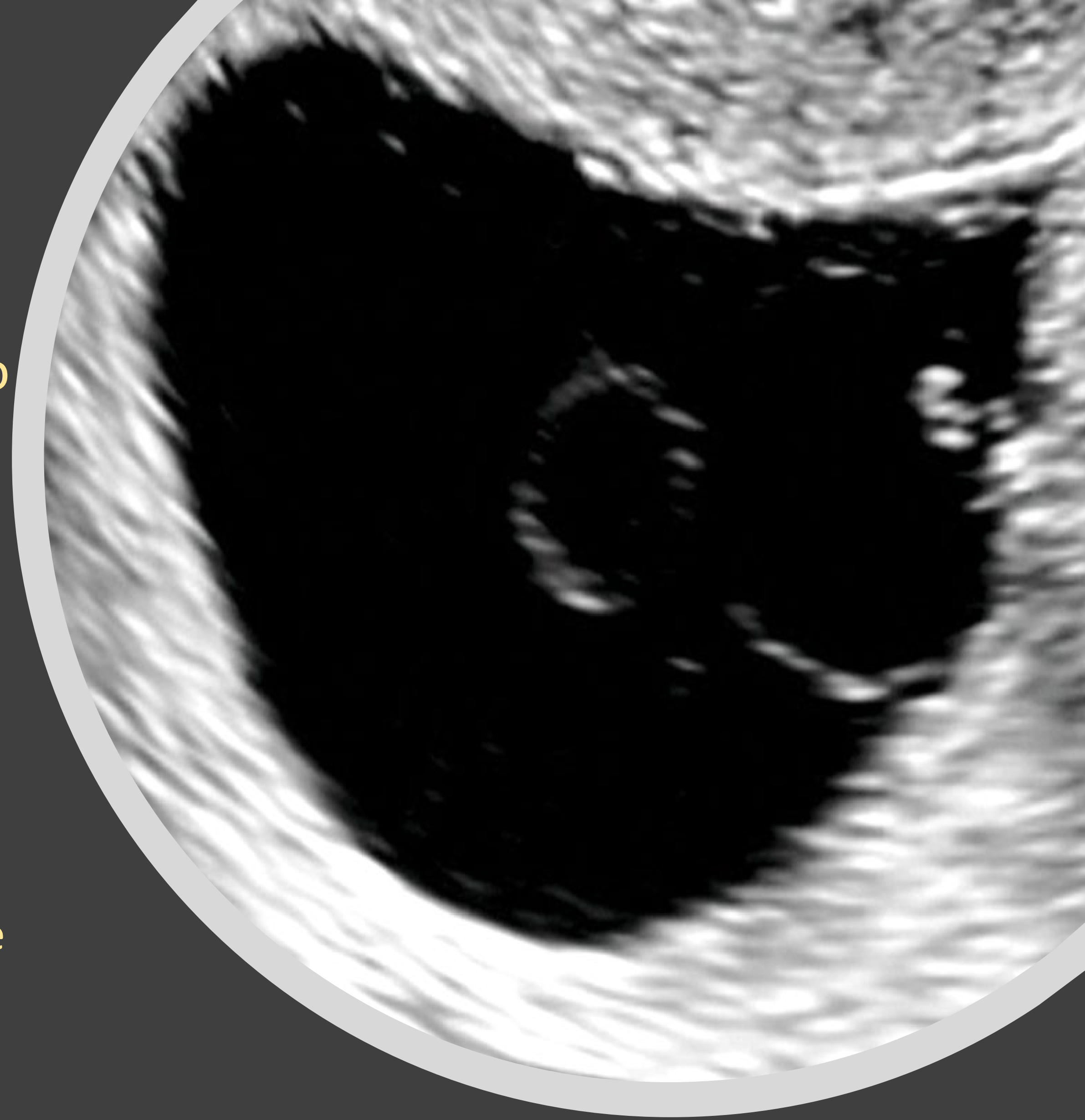
Anembryonic Pregnancy

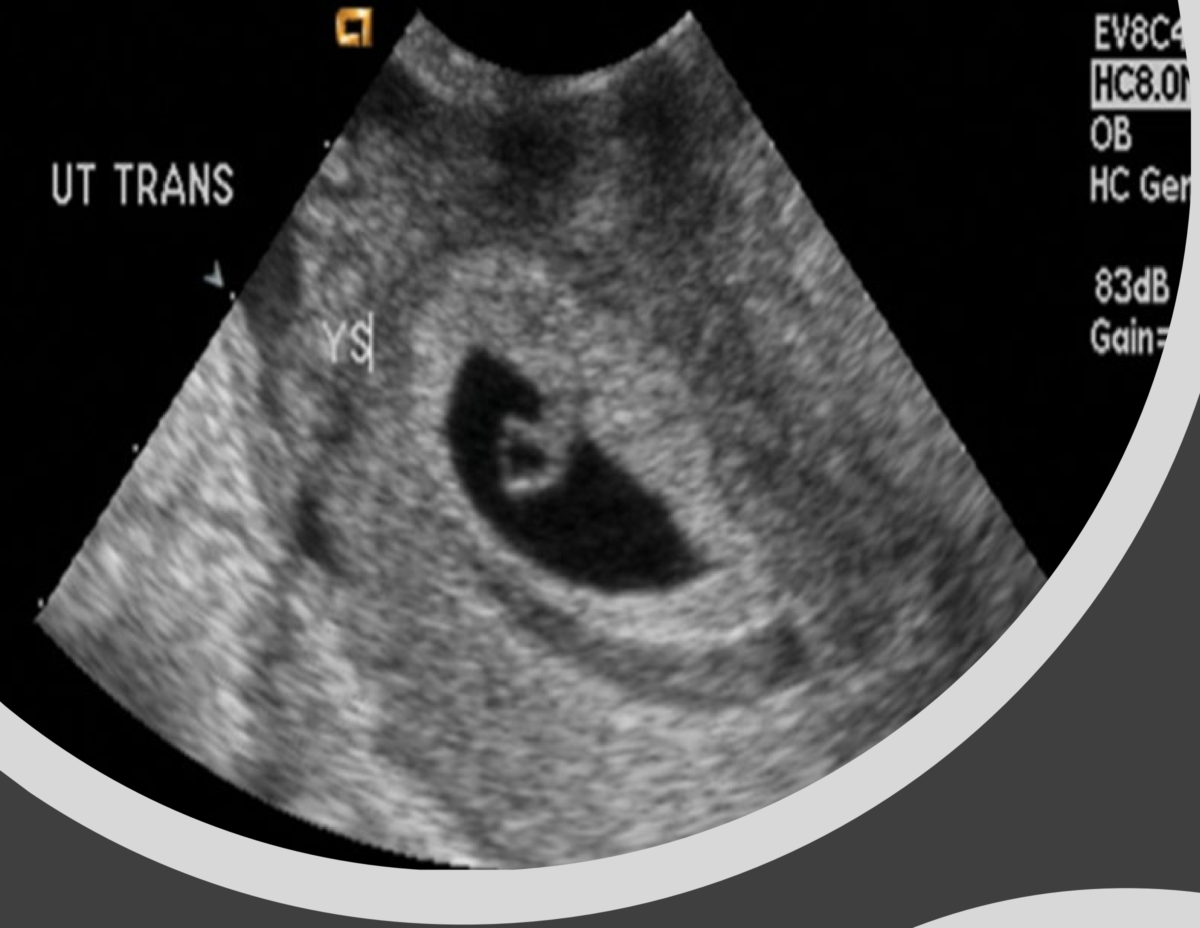
- AKA “Blighted Ovum”
  - No yolk sac
  - No embryo
  - May contain some debris
- **Empty Gestational Sac with MSD > 25mm by EVS considered diagnostic of Anembryonic pregnancy**
  - Some are waiting until MSD = 30 mm
- Conservative management: re-scan in a week to re-evaluate for yolk sac, embryo and heartbeat
  - If, after re-scan, still don’t see yolk sac or embryo, refer patient to her physician for medical care
  - Should, as in any case where live IUP not seen on first scan, give miscarriage and ectopic pregnancy instructions
  - This is not an emergency



Empty Amnion Sign

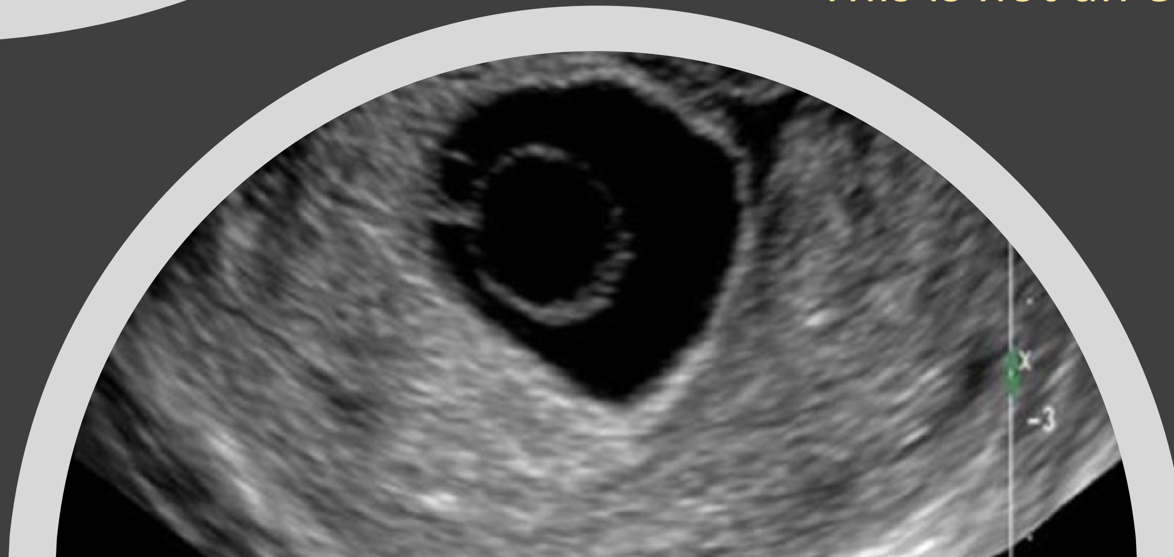
- Amnion is usually seen surrounding early embryo
- AKA "Expanded Amnion Sign"
- Visualization of amnion without evidence of normal embryo indicates pregnancy failure
  - This can only occur with embryonic demise, not anembryonic pregnancy because the amnion develops from the embryoblast.
  - May see embryonic pole, but no cardiac activity.
    - Amnion will be much larger than expected for size of embryonic pole.



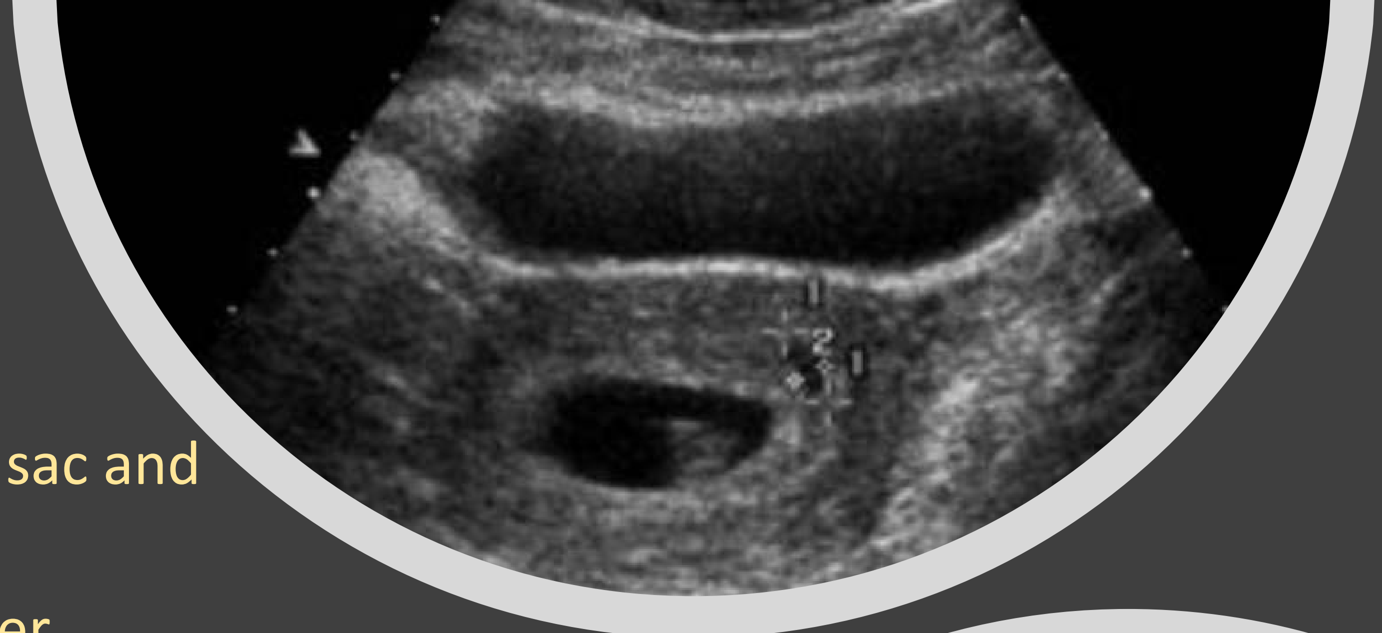


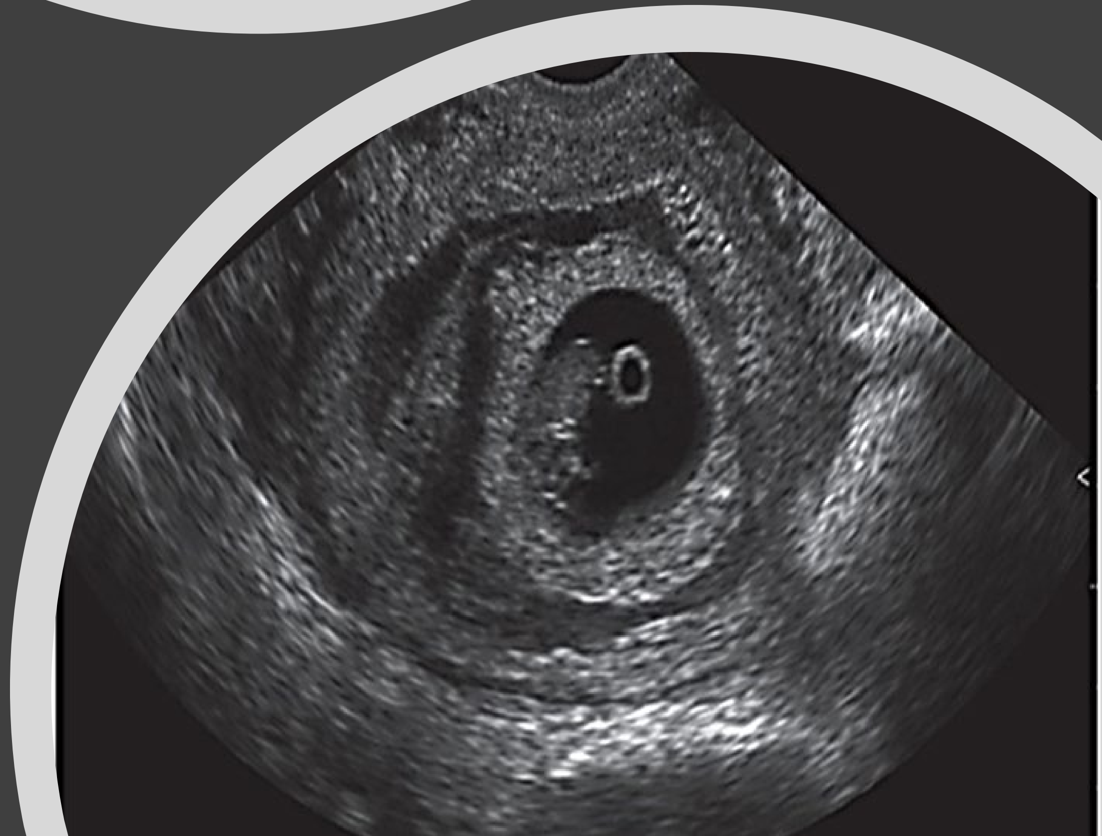
Abnormal Yolk Sacs

- Yolk sac should be round
- Should measure <5-6 mm
- Yolk sac $\geq$5mm →spontaneous abortion 3 times more likely
- Abnormally shaped Yolk sac also associated with pregnancy loss
- Mention to the interpreting physician, encourage patient to make her OB appointment soon
- This is not an emergency



Subchorionic Bleed





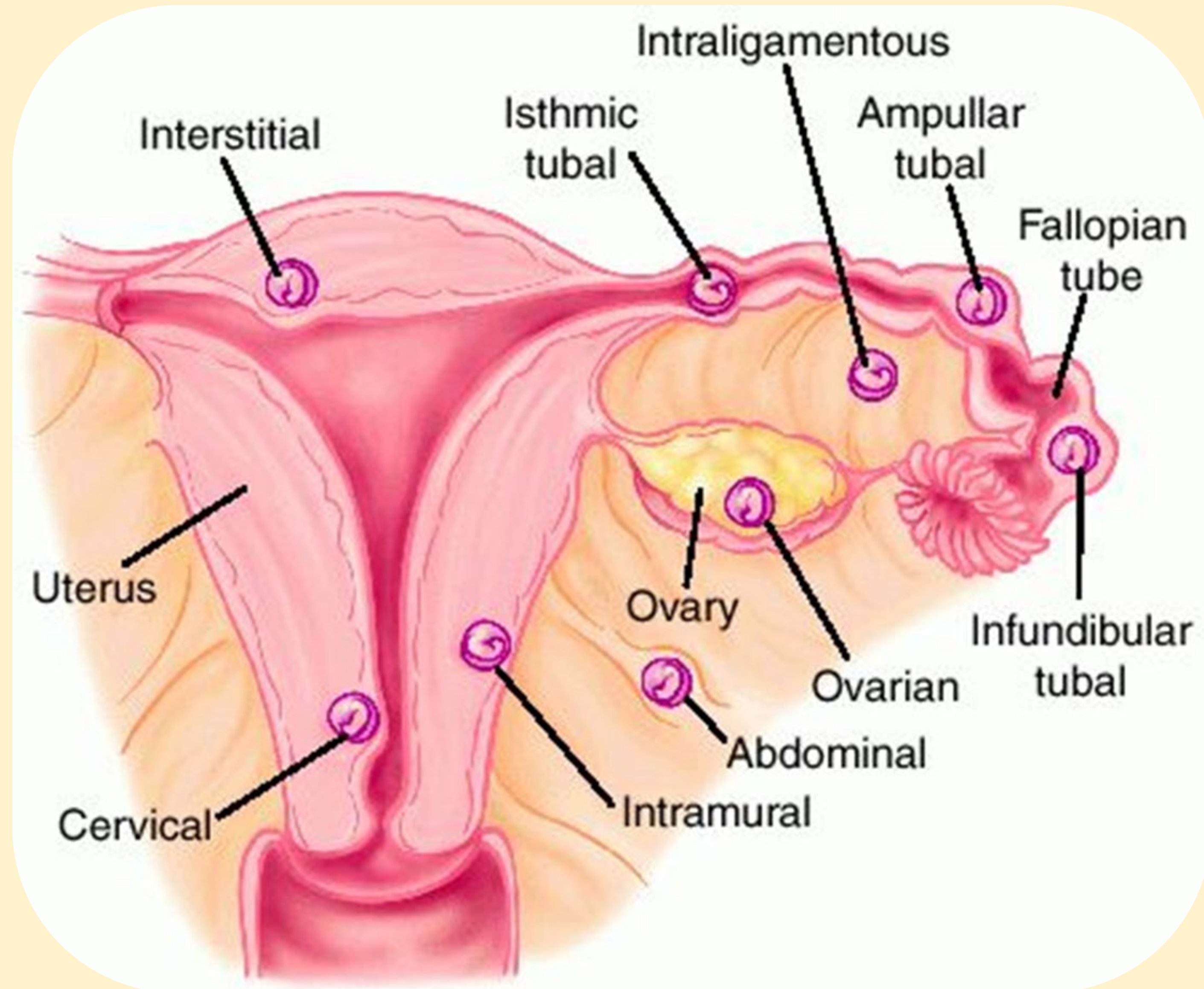
- Fluid collection between gestational sac and uterine wall
- Commonly seen in early first trimester
- Larger bleed→worse prognosis, BUT not firm correlation
  - Sometimes women with small bleeds miscarry
  - Sometimes women with large bleeds go ahead and deliver a healthy baby
- No intervention available—just watch and wait
  - Bedrest doesn't improve outcomes
  - Progestins…still gathering evidence

Ectopic Pregnancy

- Pregnancy located outside the endometrial cavity of the uterus
- Most PRCs screen for symptoms as contraindications for limited ultrasound
  - Vaginal bleeding
  - Acute pain
  - History of tubal ligation
  - History of previous ectopic pregnancy
  - Presence of IUD
- **Up to 50% of patient with ectopic pregnancies can be asymptomatic**
  - Performing ultrasound prior to 8 weeks increases likelihood of encountering the condition prior to rupture, and therefore onset of symptoms
  - Some women present with some symptoms but not the "classic triad":
    - Vaginal Bleeding
    - Acute Pelvic Pain
    - Amenorrhea

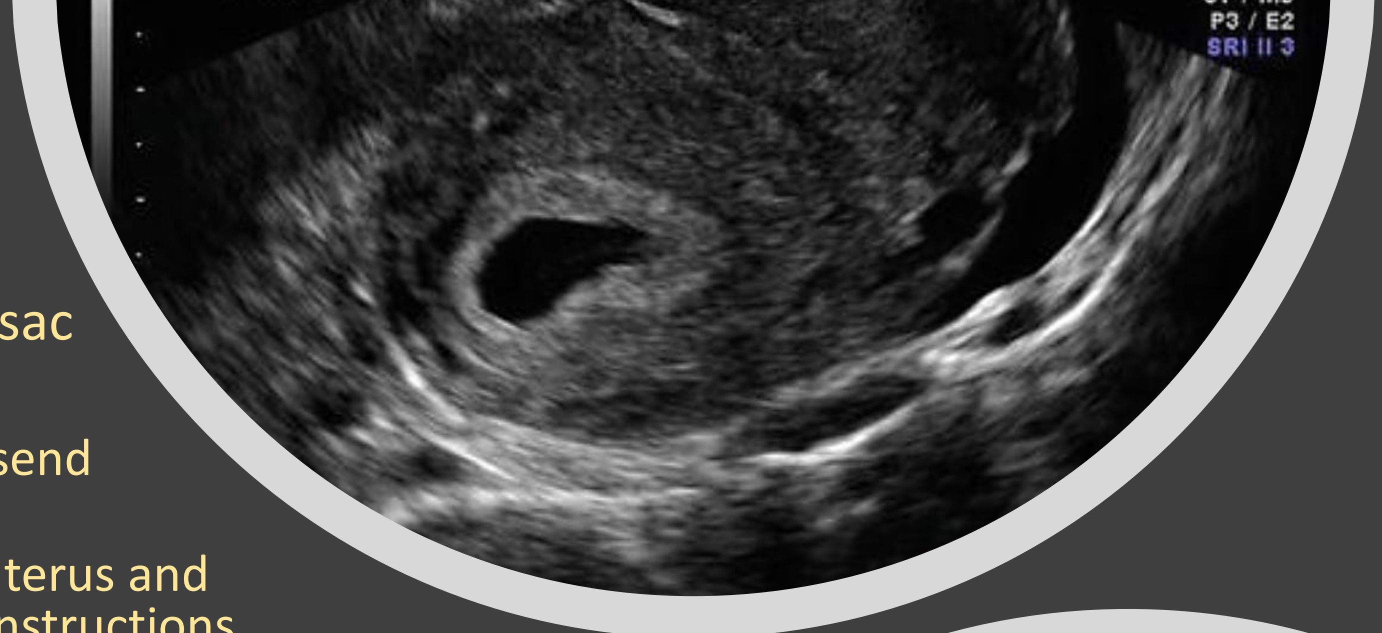
Ectopic Pregnancy

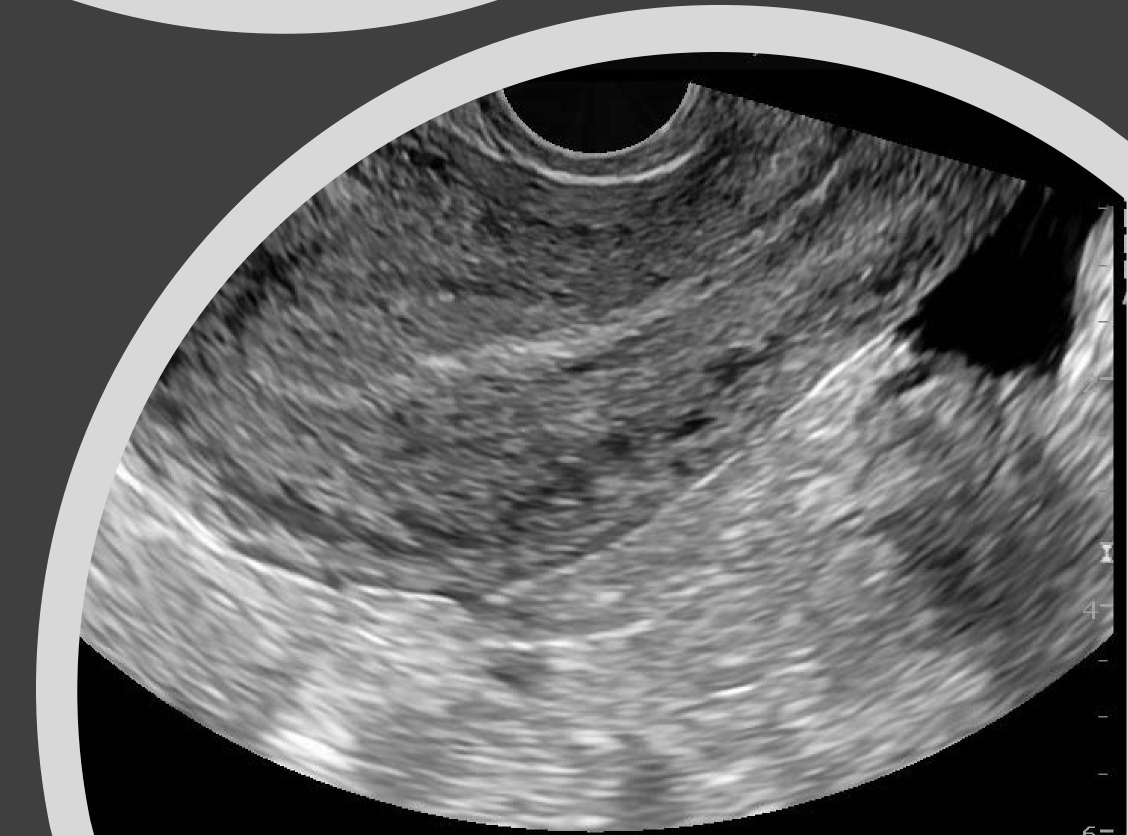
- More than 90% located in the Fallopian tube
- Risk factors:
  - Fallopian tube trauma
  - PID
  - Smoking
  - Previous ectopic
  - IUD
  - Increased maternal age
  - Assisted reproductive technology
- Usually rupture around 8 weeks
  - Isthmic—sometimes sooner
  - Interstitial—often later



What will you see?

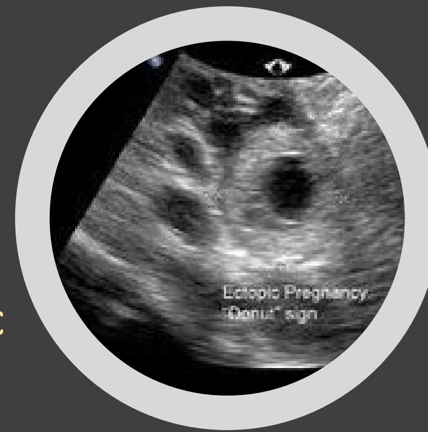
- **Empty Uterus**
  - Could be early IUP too early to see sac
  - Could be ectopic
    - If see obvious sac outside uterus, send patient to ER
    - If do not see definite sac outside uterus and patient is asymptomatic, provide instructions regarding symptoms associated with ectopic pregnancy and the importance of seeking medical care.
      - Can offer another ultrasound in 1 week to see if IUP can be located.
- May see fluid collection in endometrial cavity.
  - "**Pseudosac**"
    - Centrally located
    - No double ring
    - No embryonic pole or yolk sac, may contain debris

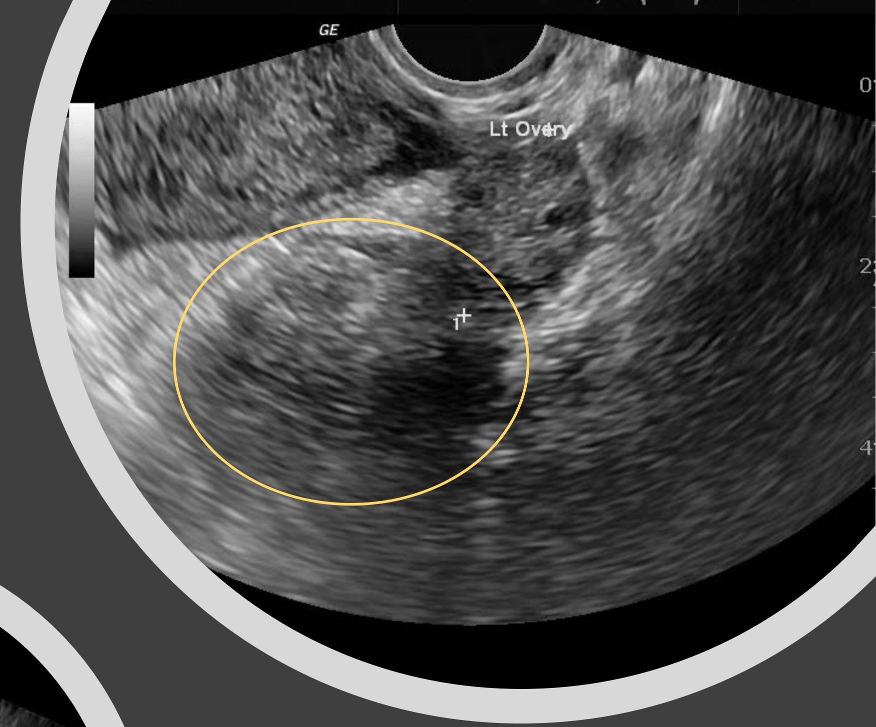


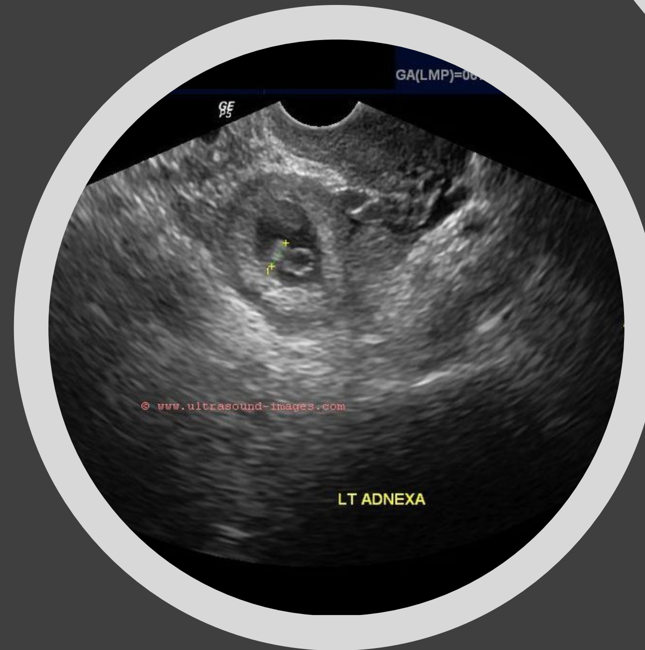


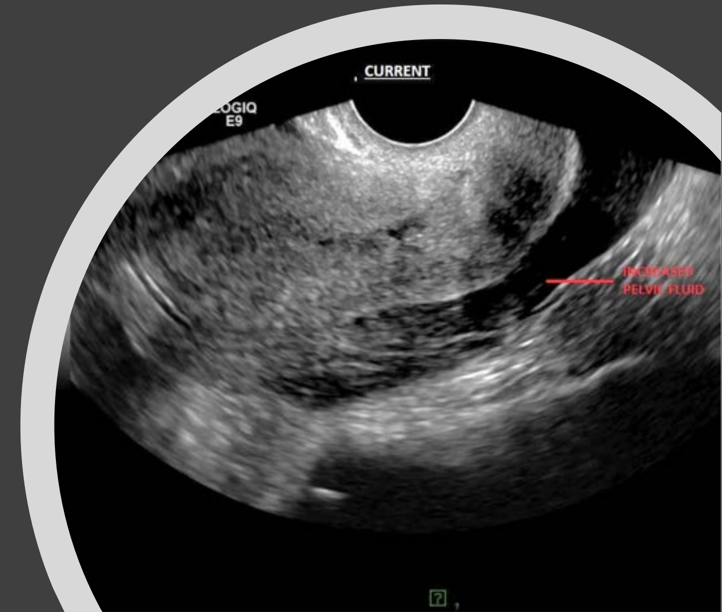
What will you see?

- **Free fluid**
  - Sandy texture—blood from ruptured ectopic
    - Important to note the amount and the presence of sandy echoes
  - Small amount of free anechoic fluid is common and not necessarily clinically significant
- **Gestational sac outside the uterus**
  - May see embryo with or without heartbeat
  - May see yolk sac
  - Look for double ring sign
- **Adnexal mass**
  - If ectopic has ruptured, may only see hypoechoic mass next to the uterus or ovary
  - Hematoma from ruptured implantation site
  - May or may not see sac
  - Will be accompanied by free fluid, patient usually in pain







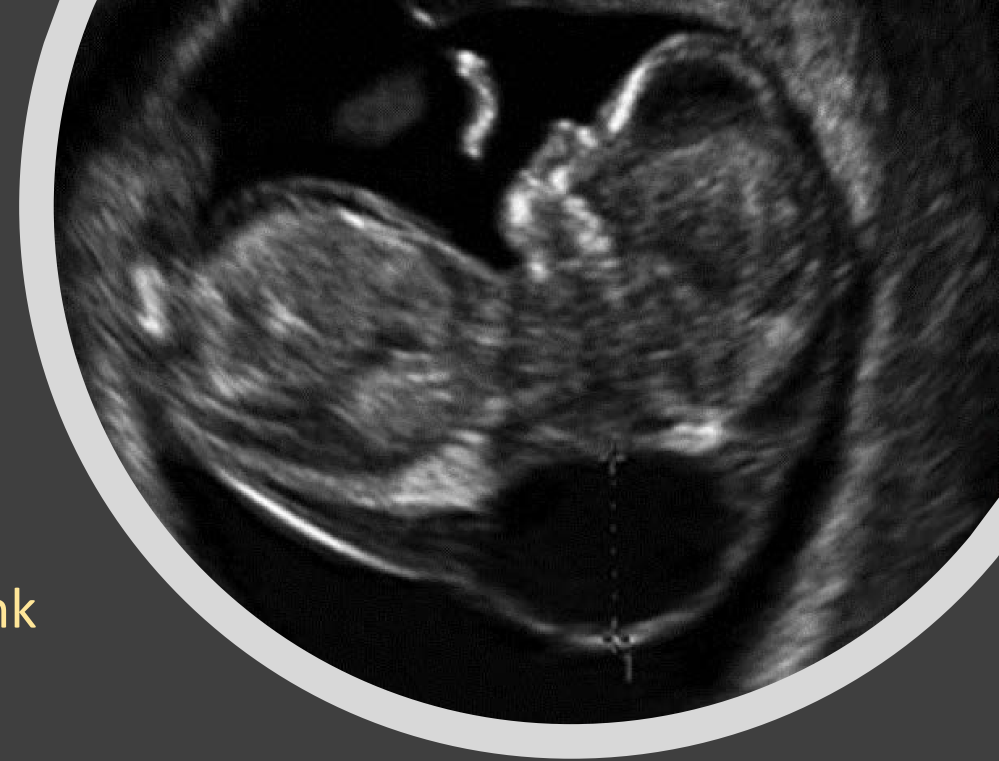


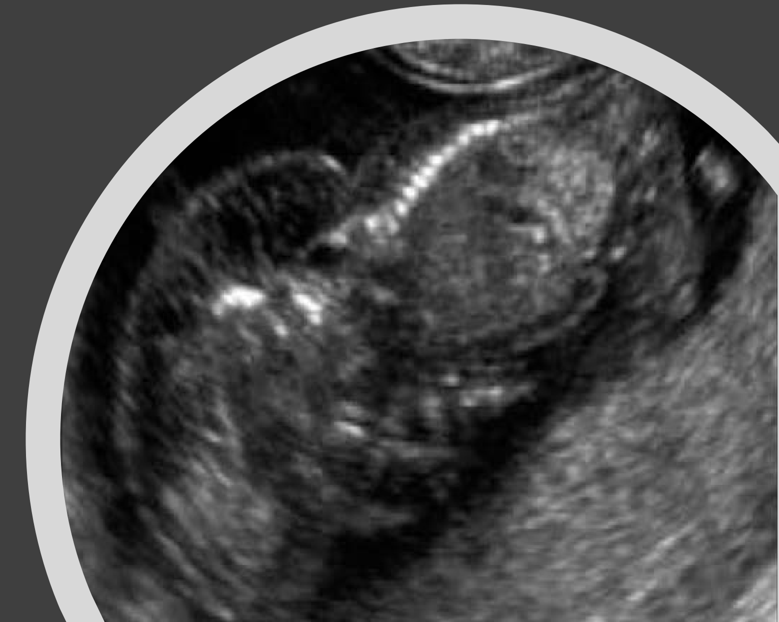
When you don't see a sac in the uterus:

- **If you see a sac outside the uterus**
  - Document it and send the patient to the emergency room.
  - If you have a way to get an immediate reading from your interpreting physician that would work too, but the patient should not leave the building without you having results and instructions.
- **If there is a large amount of free fluid in the pelvis**—surrounding the uterus and extending up to the ovaries
  - Document it and send the patient to the ER
- **If you don't see a sac anywhere, there is no more than minimal free fluid, and the patient is not in pain**
  - Offer another ultrasound in one week to re-evaluate for intrauterine pregnancy
  - Provide ectopic pregnancy instructions

Cystic Hygroma

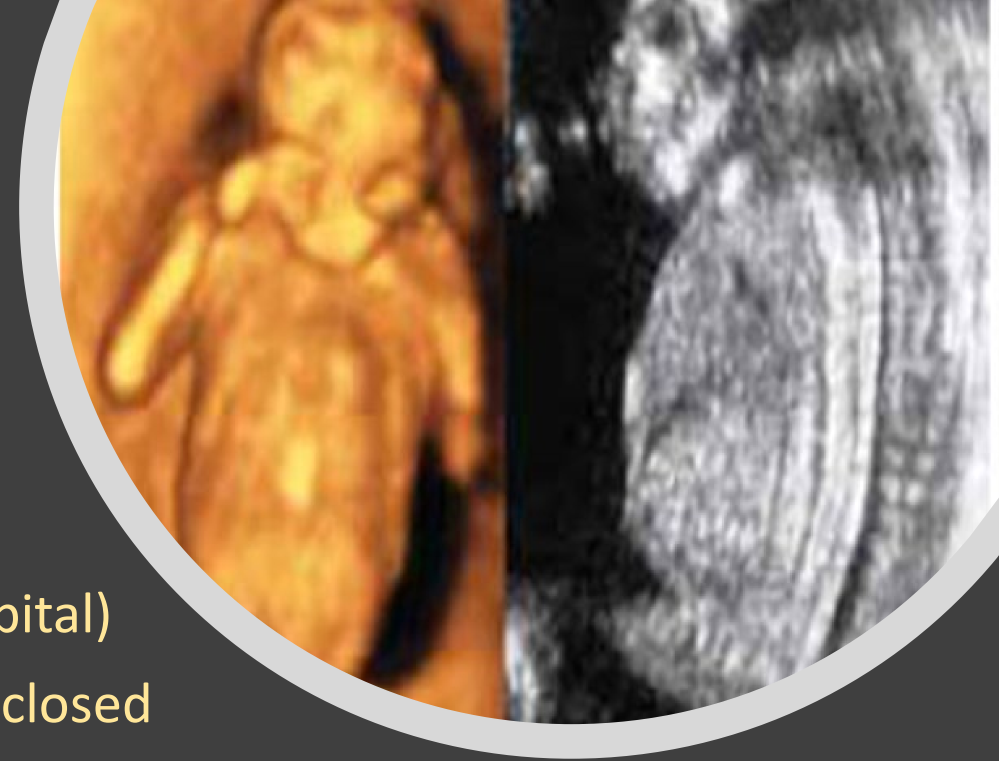
- Most commonly detected anomaly of the first trimester
- Result of obstruction of the thoracic duct
- Develops extreme lymphedema of the neck, thorax, and trunk
- Associated with genetic birth defects
- Most end in fetal demise

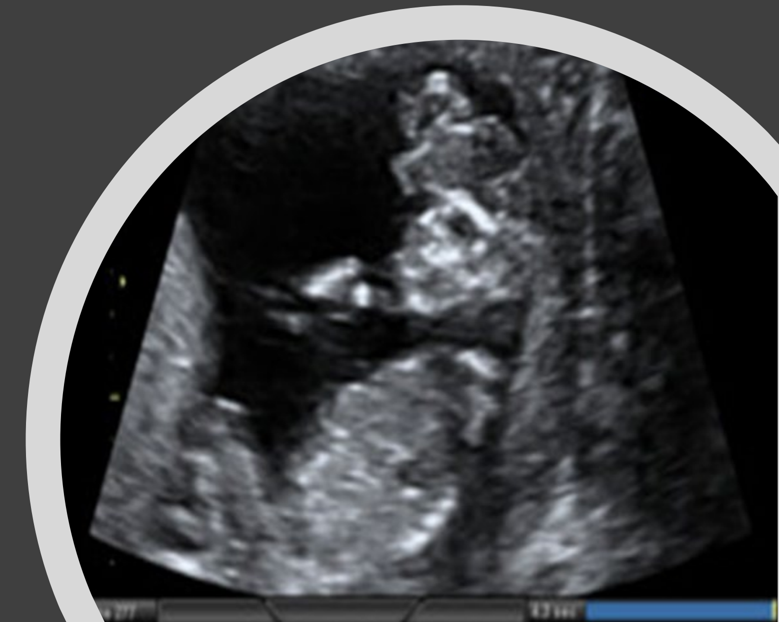




Acrania

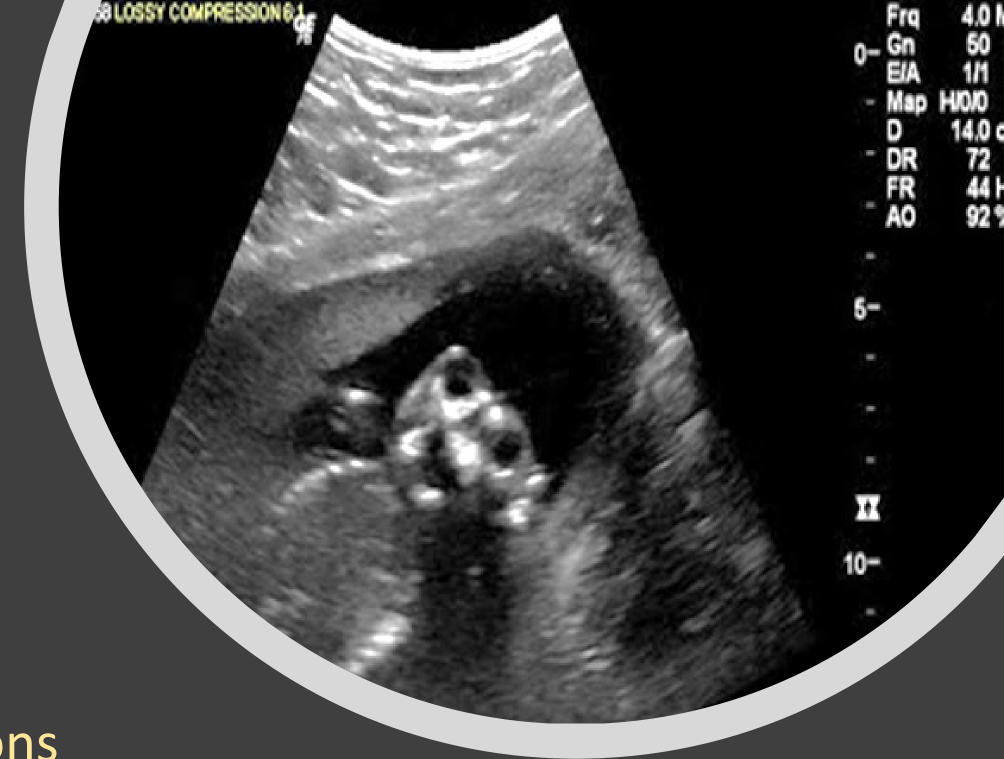
- Neural tube defect
- Absence of the cranial bones (parietal, temporal, frontal, occipital)
- Cerebral tissue is present but disorganized because it’s not enclosed by the cranium
- Believed to progress to anencephaly due to erosion of cerebral tissue by the amniotic fluid

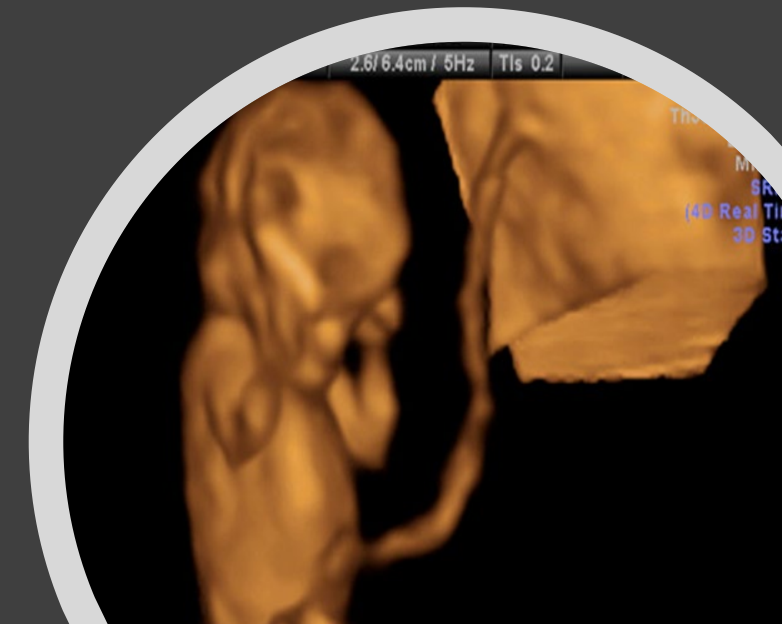




Anencephaly

- Absence of cranial bones and cerebral tissue
- Facial bones end just above the orbits
- Fairly easy to detect near the end of the first trimester
  - Which means you will likely notice it if you're scanning
- Anencephaly & Acrania are both considered terminal conditions
  - Many die in utero
  - Most live only a few hours
  - There are cases in the literature of babies living up to 3 years with anencephaly





Pregnancy of Unknown Location

- Increasing issue currently
  - Addressed by multiple physicians in the past few years
- Performing sonography earlier in pregnancy, especially in the ER
  - Women come in complaining of pain
  - hCG positive but often not at discriminatory level of 1500
  - Uterus is empty; extra-uterine gestational sac also not seen
- Recommended conservative treatment:
  - Watch & wait—do serial quantitative hCG and repeat sonogram
- Problem:
  - Many cases reported of physicians treating these cases with methotrexate
  - Often the pregnancy turns out to be early or failing IUP rather than ectopic
    - Failing IUP—would have miscarried on its own, no need for a toxic drug with side effects
    - Early IUP—methotrexate usually causes a miscarriage and, if not, it can cause birth defects

Why Do PRC Medical Volunteers Need to Know These Things?

- Diagnosis of anomalies is well beyond the scope of a limited OB ultrasound performed at the PRC.
  - We must be very careful not to exceed those parameters unless we have the training, credentials, and backing of the medical director at the clinic
    - Even if you are a highly qualified sonographer, you must stay within the scope of sonography as described and approved by the medical director and board at your PRC.
- We need to know enough about what we see to recognize when things look “not normal”.
  - Need to know when to mention something to the interpreting physician and/or medical director
  - Need to know when to encourage the patient to make her appointment with her OB doctor as soon as possible
  - Need to know when the patient needs to go to the ER
- We do not need to tell the patient something is wrong with their baby
- We need to be credible in our use of the technology

The light shines in the darkness,
and the darkness can never extinguish it.

John 1:5 (NLT)

walkhumblywithGod.wordpress.com

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