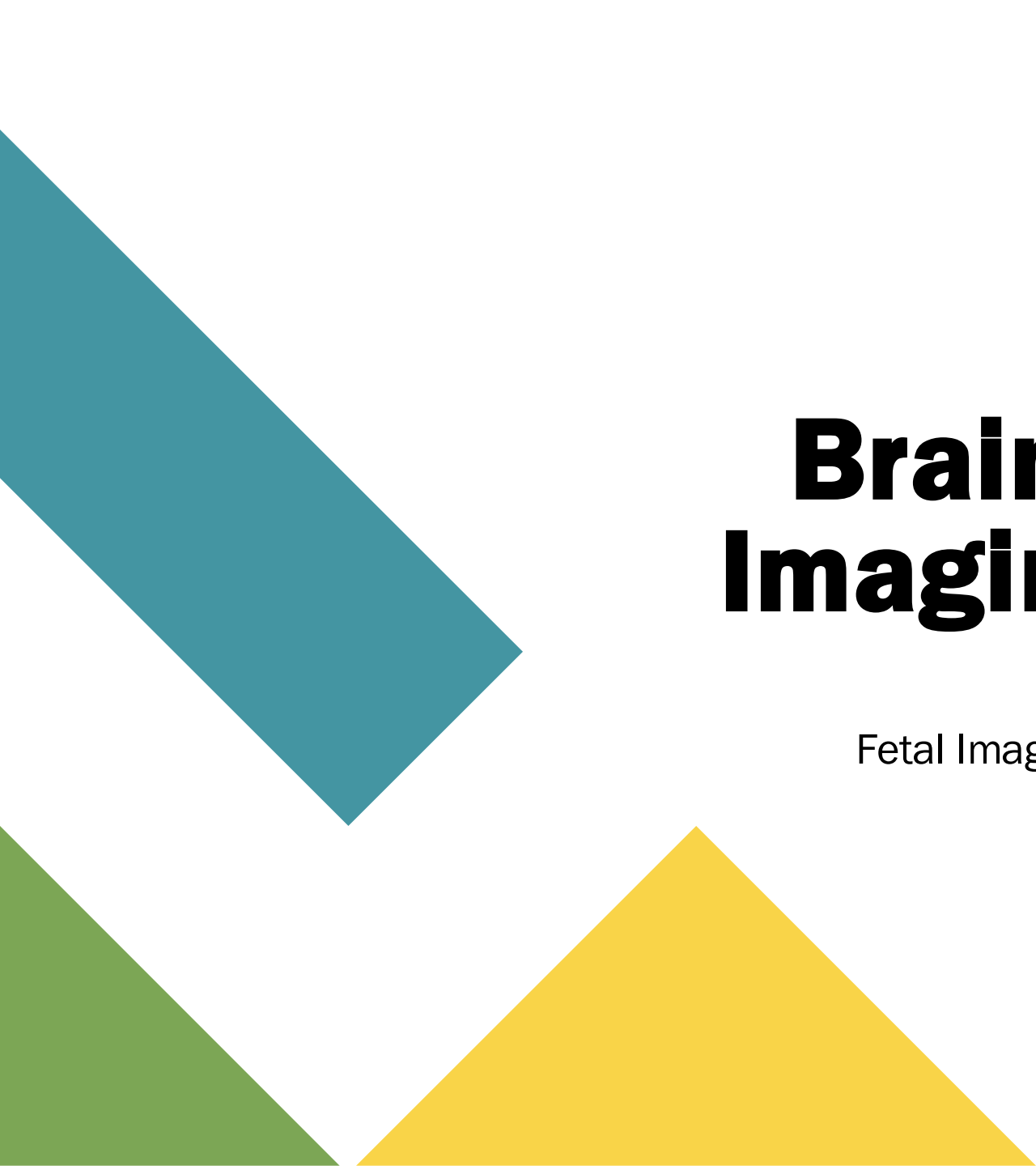




Brain Ultrasound Imaging Made Easy

Fetal Imaging Conference – October 09, 2026

James Liu, MD

Disclosures

- No financial relationships to disclose.

Objectives

- Identify fetal neuroanatomy that may be assessed in the first trimester
- Describe normal fetal neuroanatomy in the second trimester
- Create a differential diagnosis for commonly seen fetal neurologic abnormalities

Background/Prevalence

- Fetal brain anomalies occur at a rate of ~1-2/1000 births
- Sensitivity of prenatal diagnosis (ultrasound): ~70-90%
- Can range from subtle to severe/lethal anomalies

First Trimester

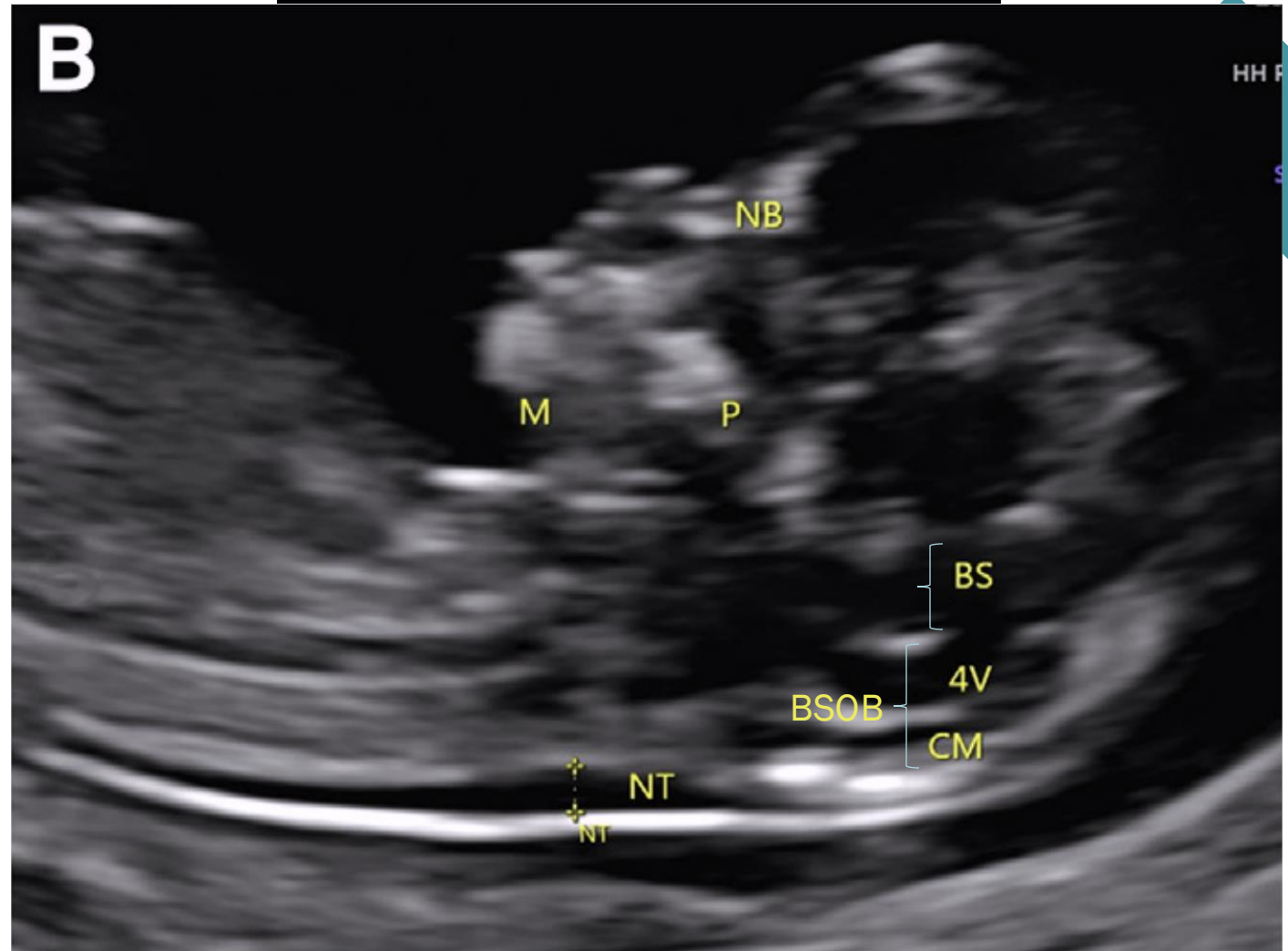
First Trimester

- Can see rhombencephalon forming as early as ~8 weeks.
- Current ISUOG recommendations:
 - Basic evaluation of cranial bones, midline falx, and choroid plexus/ventricles
 - Able to diagnose acrania, alobar holoprosencephaly, and cephaloceles



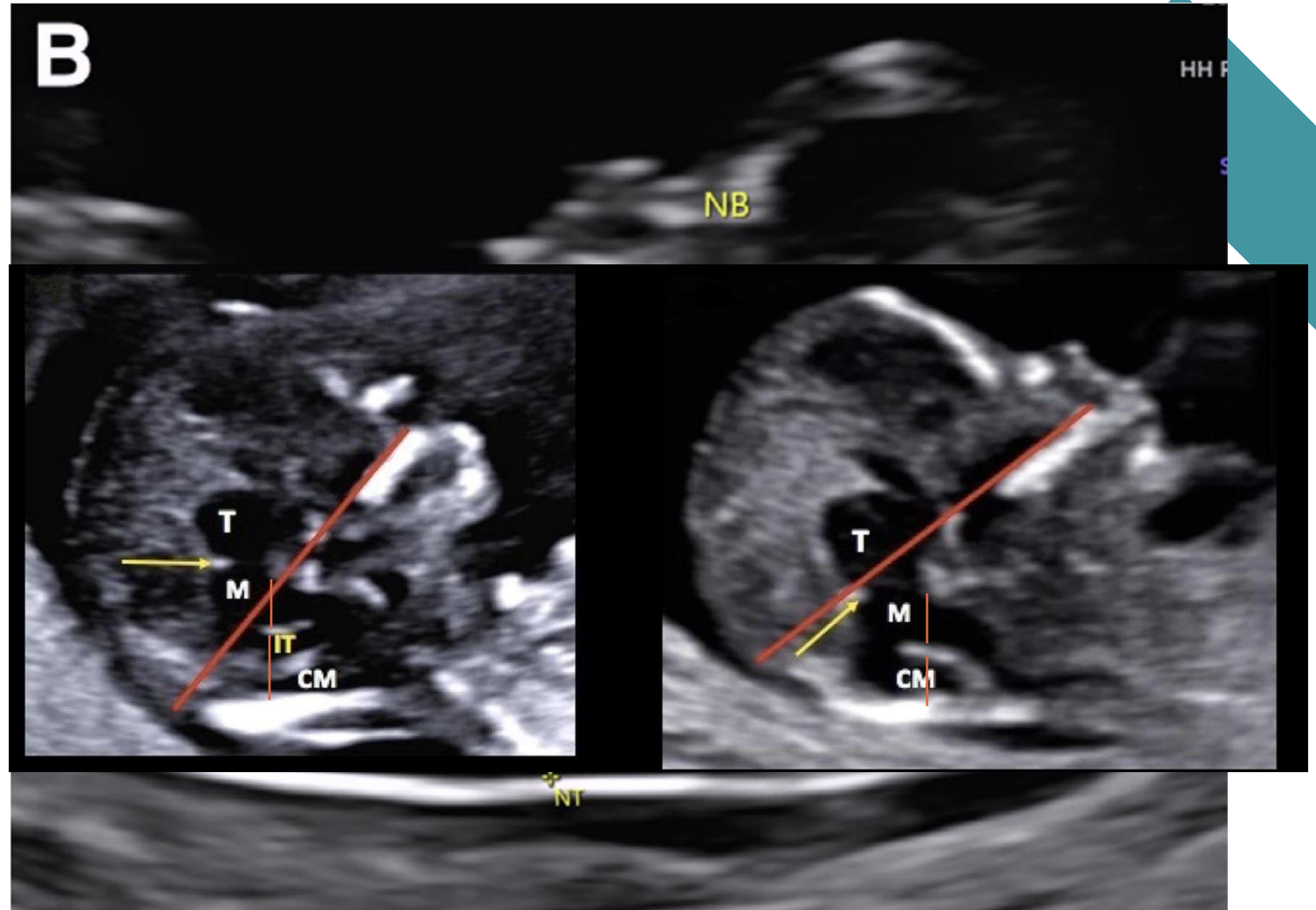
First Trimester

- US evaluation at ~11-13 weeks
 - Axial views
 - Suprathalamic
 - Transthalamic
 - Mid-sagittal view



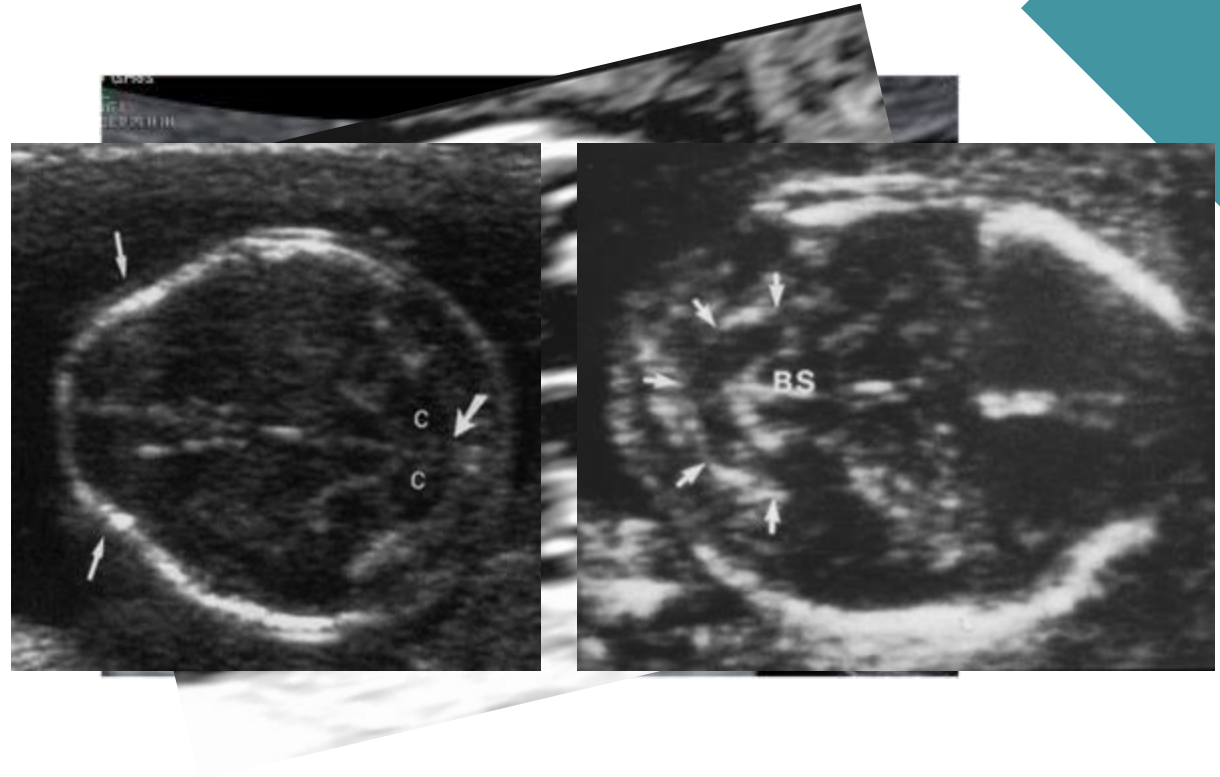
First Trimester

- Abnormal findings – open NTD
 - Mid-sagittal view
 - Posterior displacement of brainstem and/or obliteration of cisterna magna
 - Maxillo-Occipital Line
 - Brainstem-BSOB ratio >1



First Trimester

- Abnormal findings – open NTD
 - Axial views
 - Lemon sign
 - Banana sign
 - Transthalamic
 - Dry brain
 - Crash sign



First Trimester

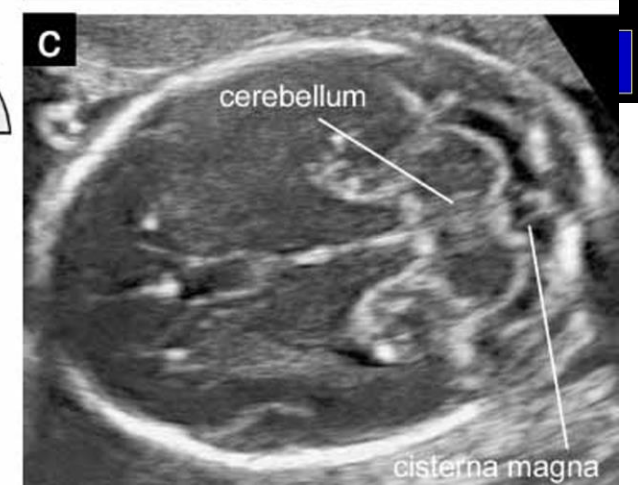
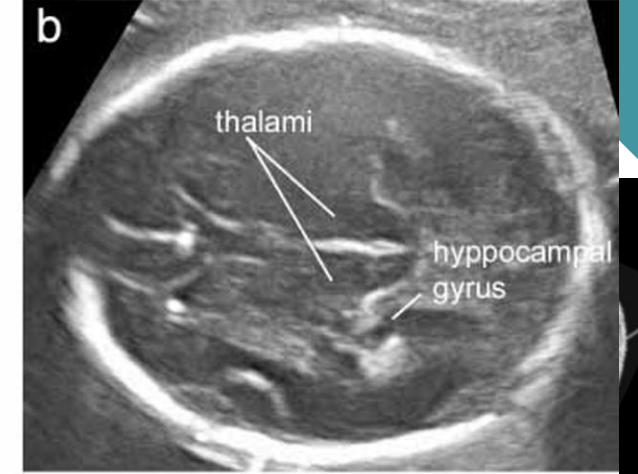
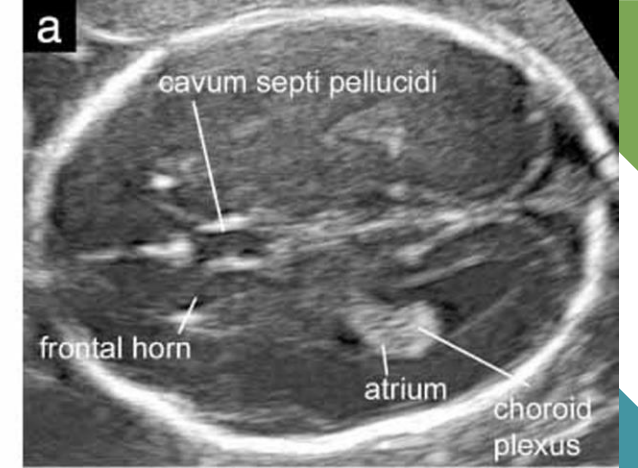
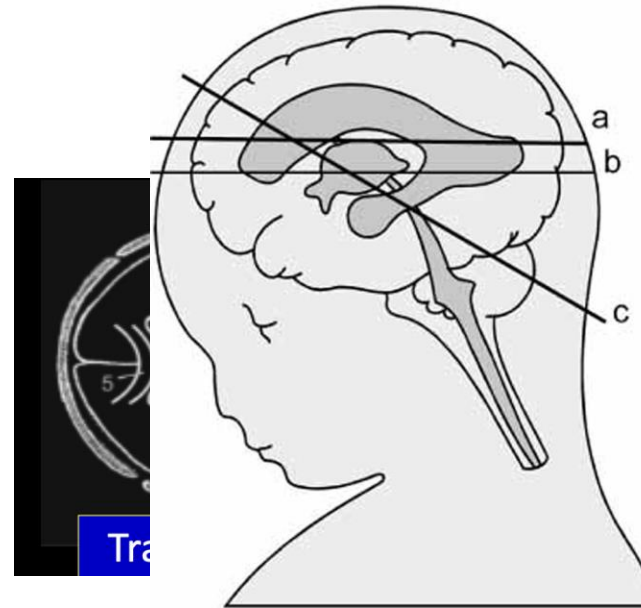
- Acrania/Exencephaly
- Encephalocele
- Alobar holoprosencephaly



Second Trimester

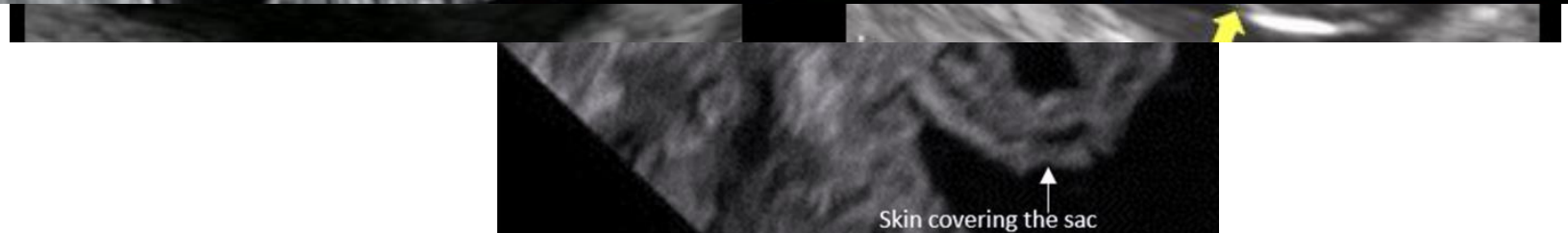
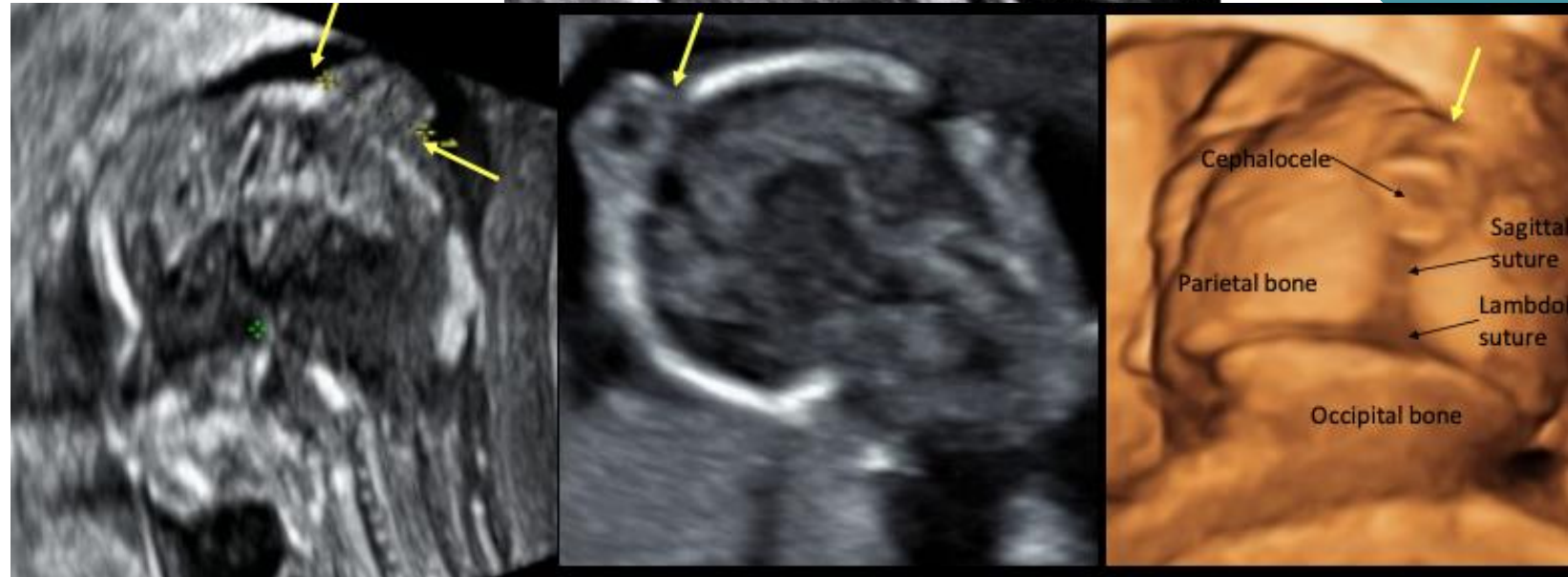
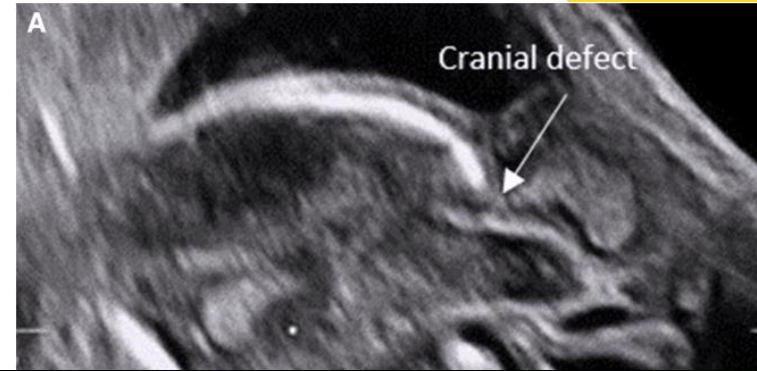
Second Trimester

- Current ISUOG recommendations:
 - Transventricular plane
 - Transthalamic plane
 - Transcerebellar plane



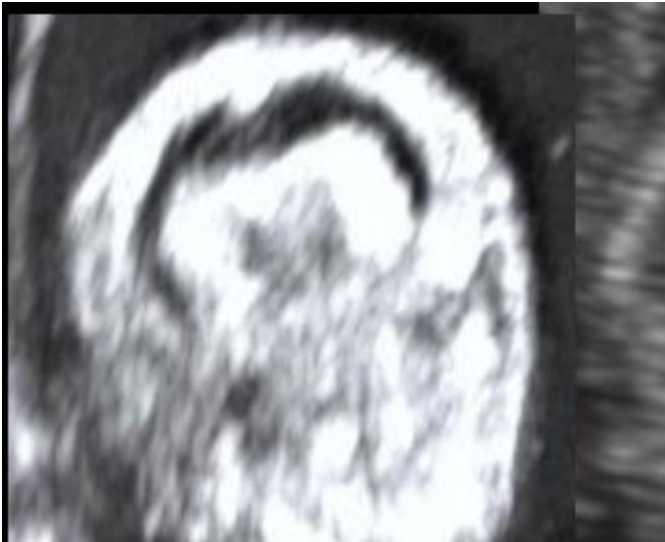
Second Trimester

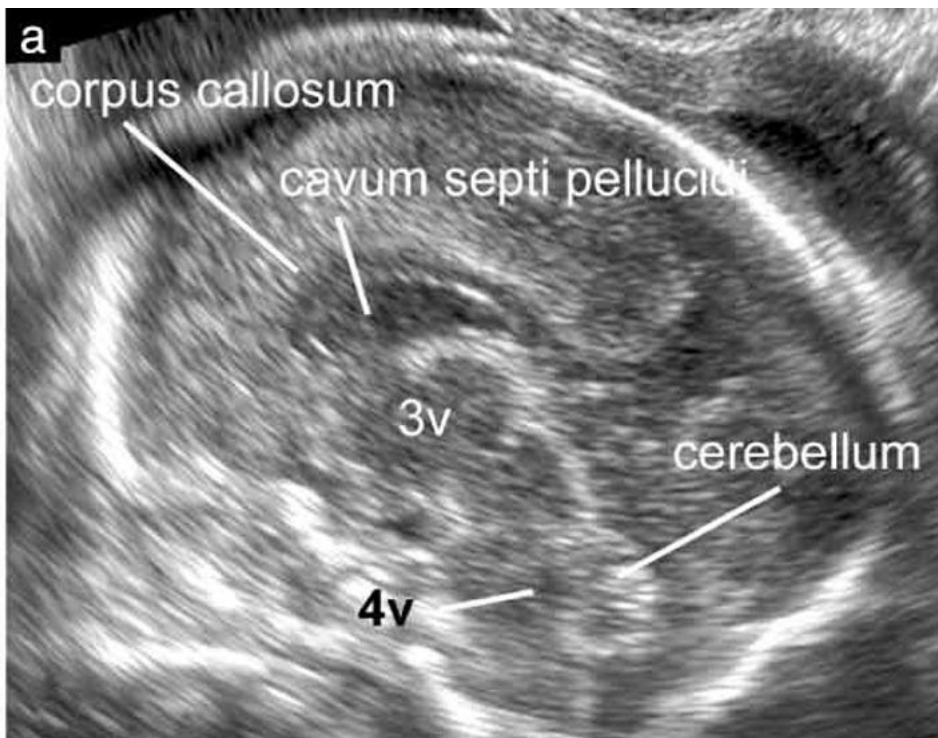
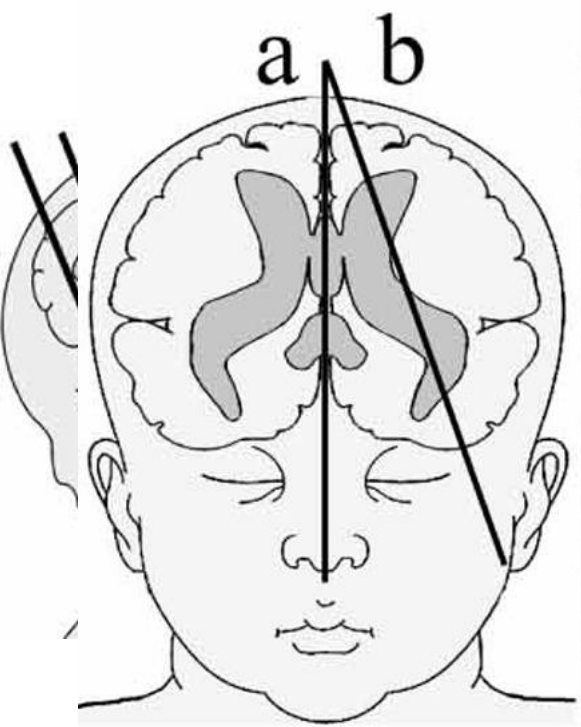
- Abnormal findings
 - Abnormal calvarium
 - Cephalocele
 - Open NTD



Second Trimester

- Abnormal findings
 - Holoprosencephaly





- Detailed fetal neurosonography

- Coronal planes

- Transfrontal
- Transcaudate
- Transthalamic
- Transcerebellar

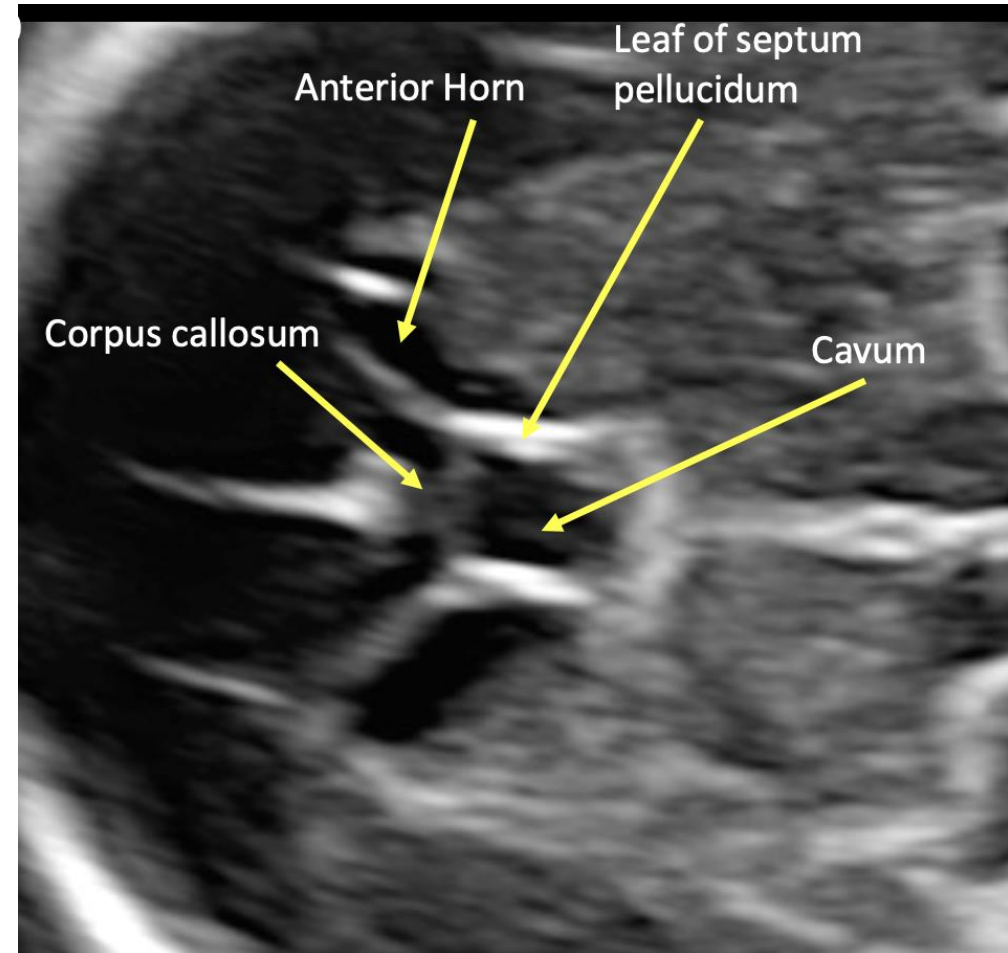
- Sagittal planes

- Mid-sagittal
- Para-sagittal

Cavum Septum Pellucidum (CSP)

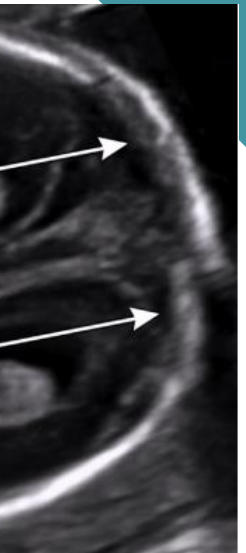
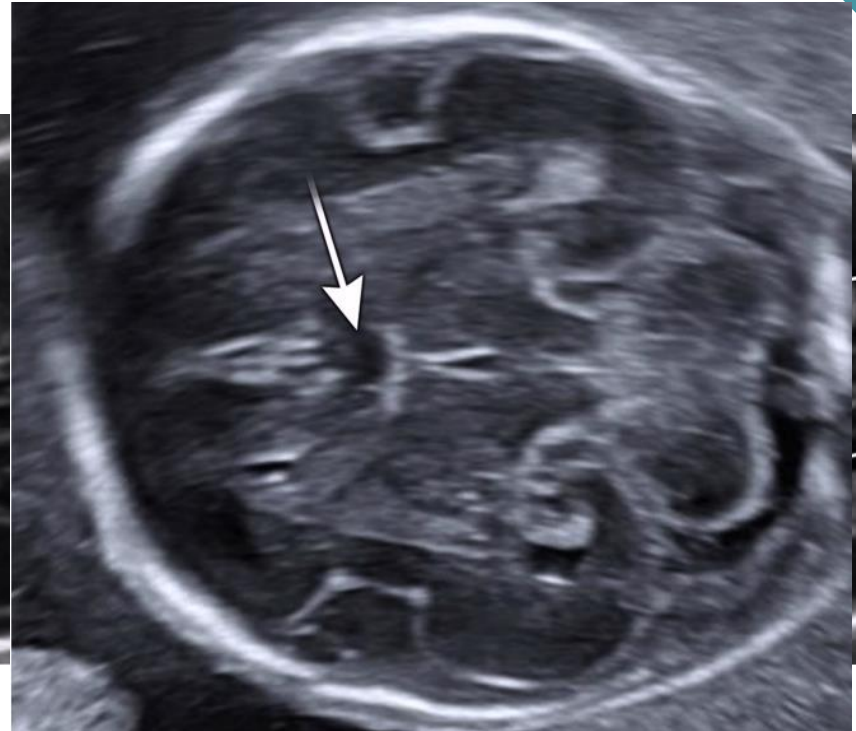
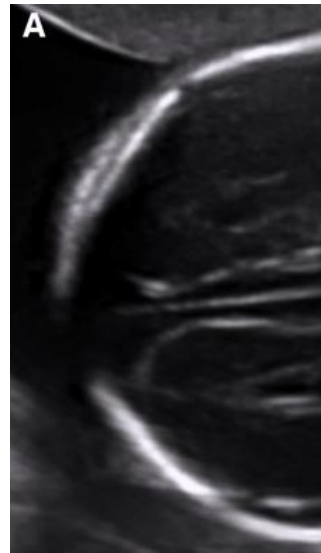
Typically seen between 17-37 weeks gestation

- Bounded by genu and body of corpus callosum, leaflets of septum pellucidum, anterior limbs/pillars of fornix



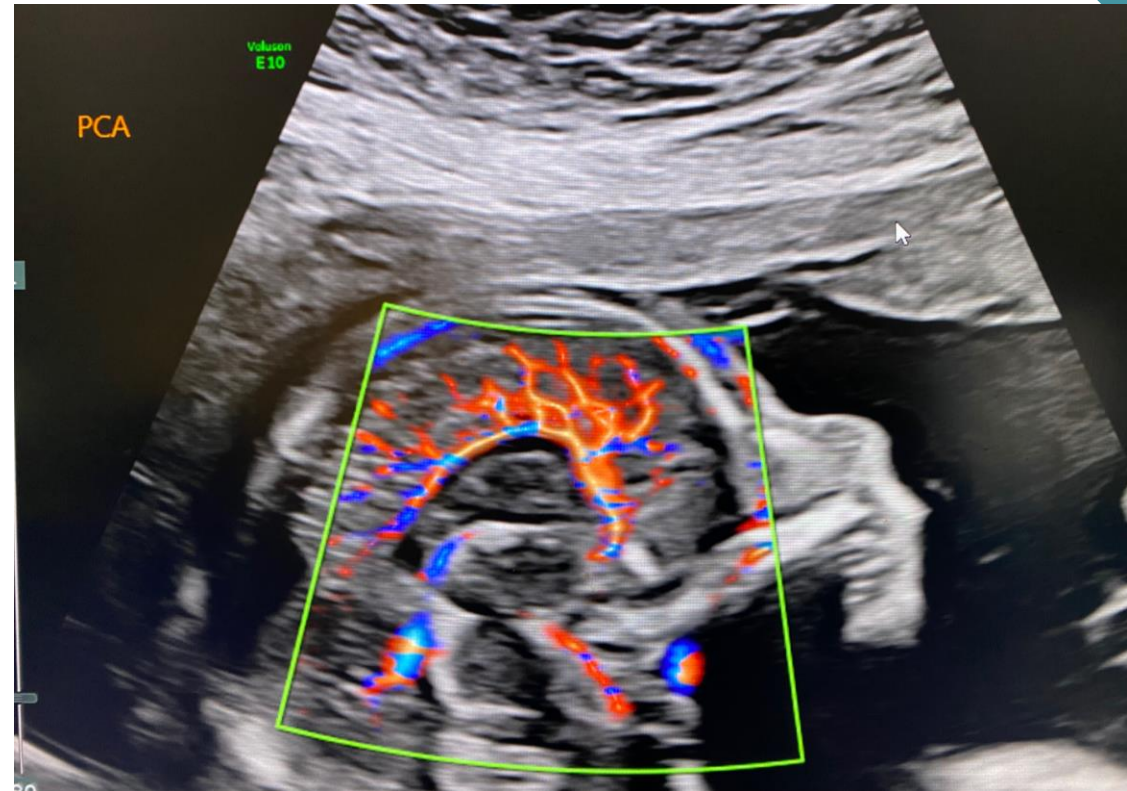
Second Trimester

- Abnormal findings
 - Absent/abnormal CSP
 - Ventriculomegaly
 - Agenesis of corpus callosum
 - Septo-optic dysplasia
 - Holoprosencephaly



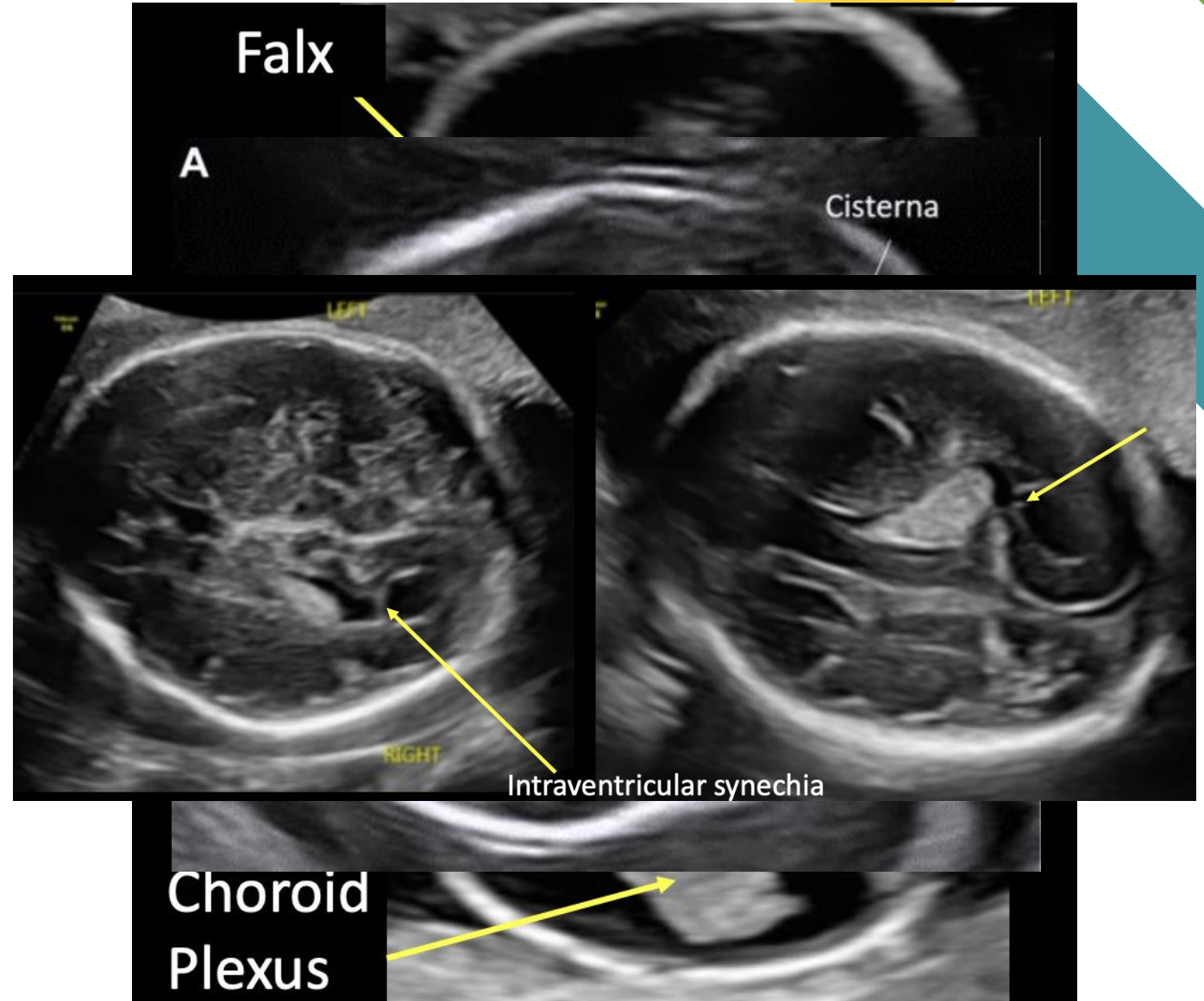
Aggenesis of the Corpus Callosum

- Can be complete, partial, dysgenesis, thinning, etc
- Associated with additional fetal abnormalities in ~60% of cases
- Chromosomal abnormality present in ~20% of cases



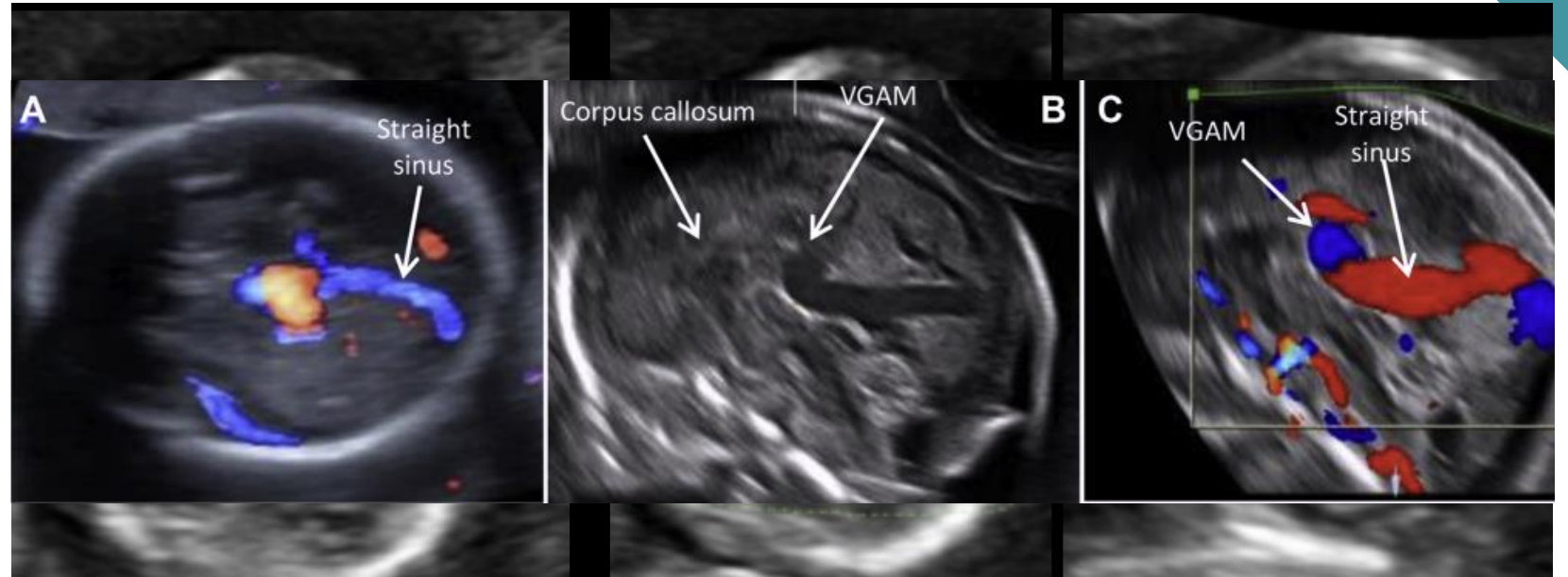
Second Trimester

- Abnormal findings
 - Ventriculomegaly (10 mm in diameter)
 - Aqueductal stenosis
 - Open NTD/Chiari II
 - Dandy-Walker
 - Infection (CMV)



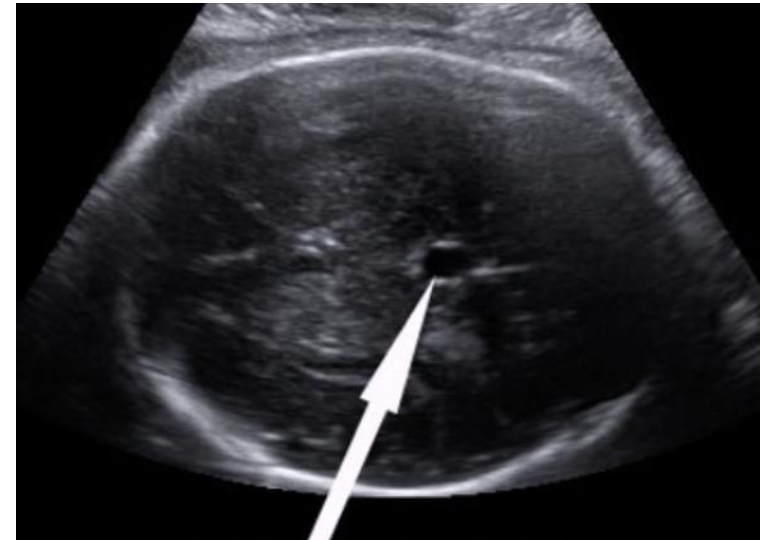
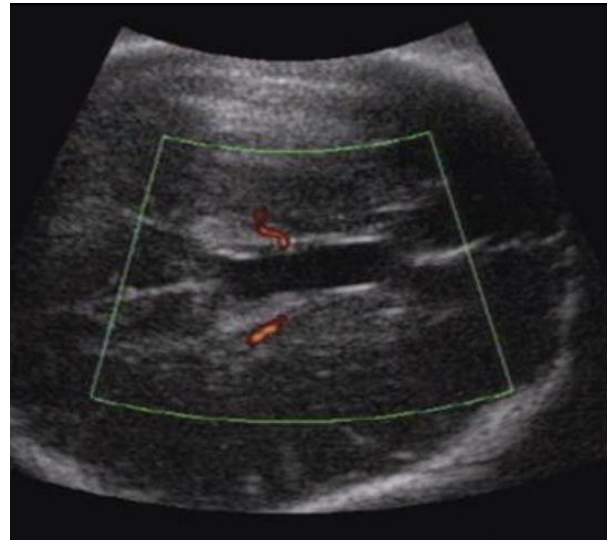
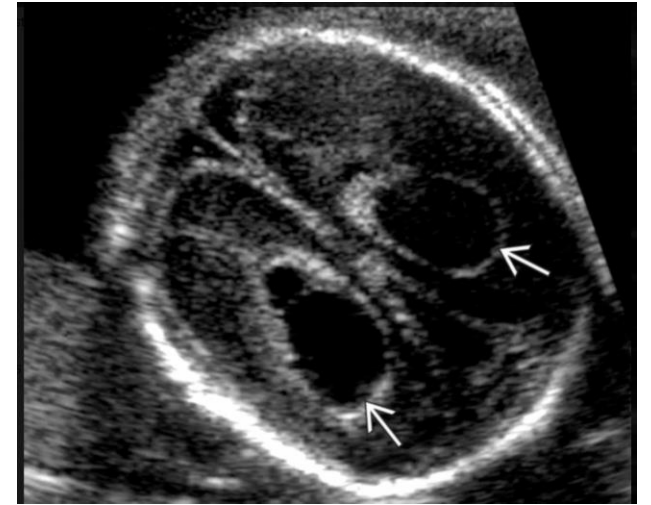
Second Trimester

- Other findings
 - Arachnoid cyst
 - Vein of Galen aneurysm



Normal variants

- Choroid plexus cysts*
- Cavum vergae
- Cavum veli interpositi



Intracranial hemorrhage

- Estimated to affect up to 1:1000-1:10000 pregnancies
- Imaging
 - Acute: Echogenic, homogeneous
 - Older: Heterogeneous appearance, rim-enhancing
 - May evolve into porencephalic cyst





Questions?

References

- [SMFM Fetal Anomalies Consult Series #3: Intracranial anomalies](#)
- Volpe, N., Dall'Asta, A., Di Pasquo, E., Frusca, T. and Ghi, T. (2021), First-trimester fetal neurosonography: technique and diagnostic potential. Ultrasound Obstet Gynecol, 57: 204-214. <https://doi-org.cuanschutz.idm.oclc.org/10.1002/uog.23149>
- (2007), Sonographic examination of the fetal central nervous system: guidelines for performing the 'basic examination' and the 'fetal neurosonogram'. Ultrasound Obstet Gynecol, 29: 109-116. <https://doi-org.cuanschutz.idm.oclc.org/10.1002/uog.3909>