



Interesting Fetal Cases

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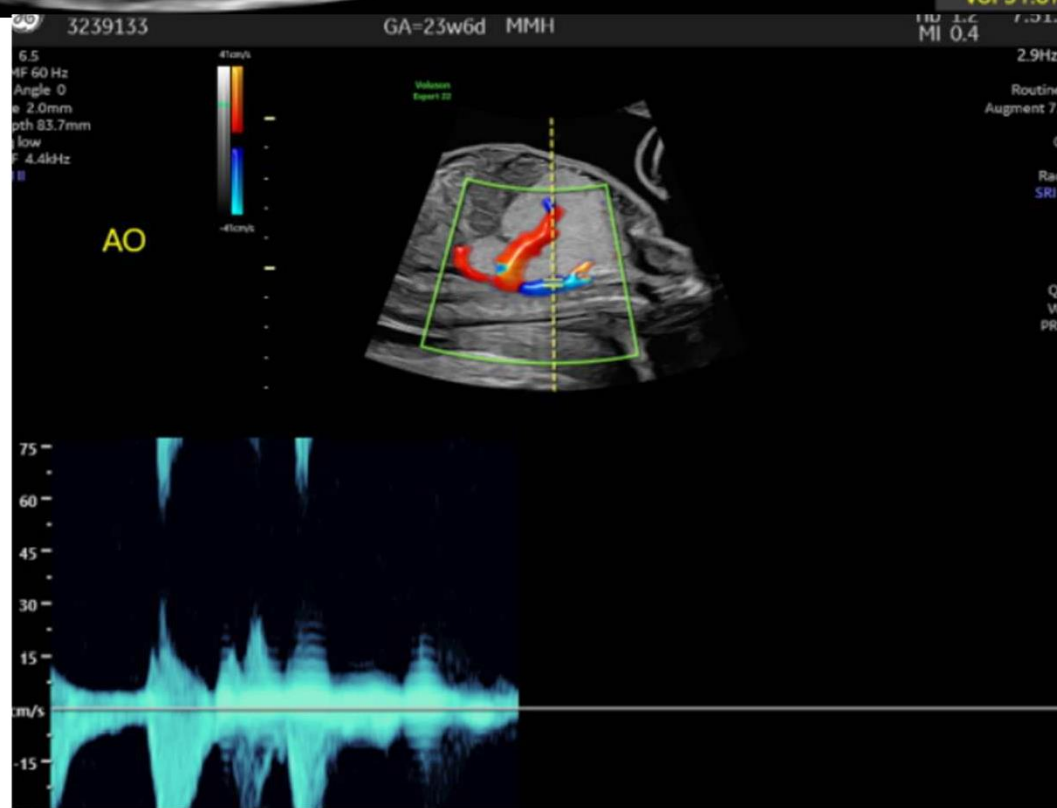
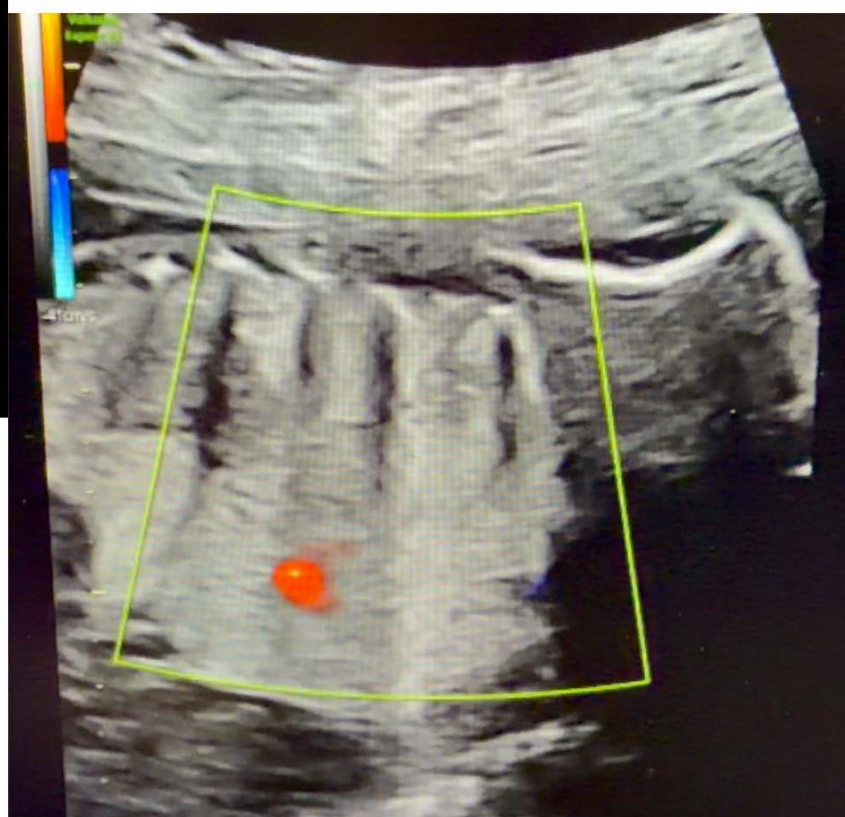
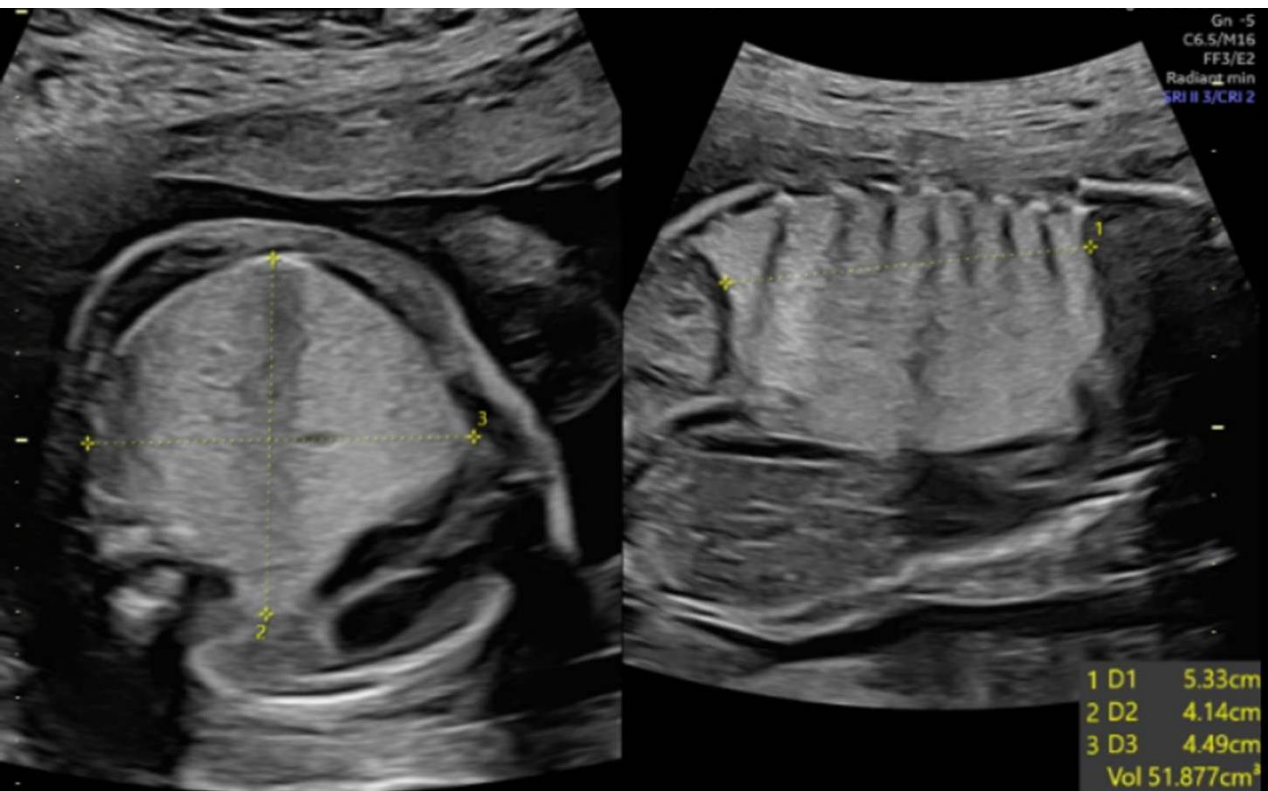
*22nd Annual High-Risk Fetal Imaging &
Perinatal Update Conference*

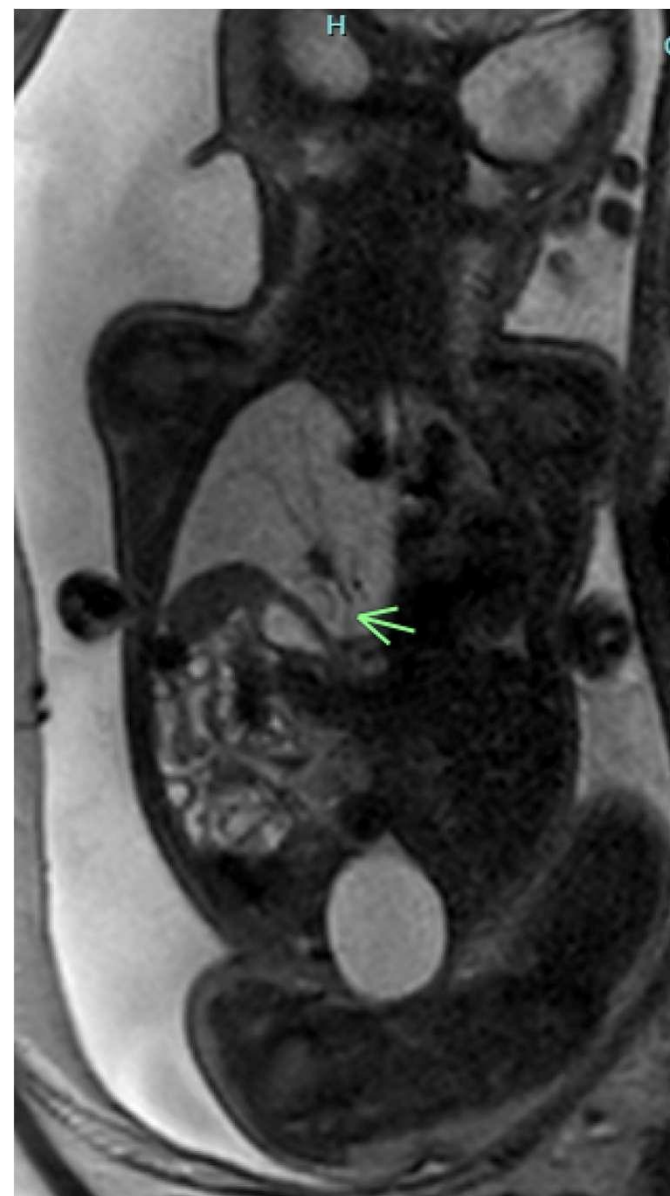
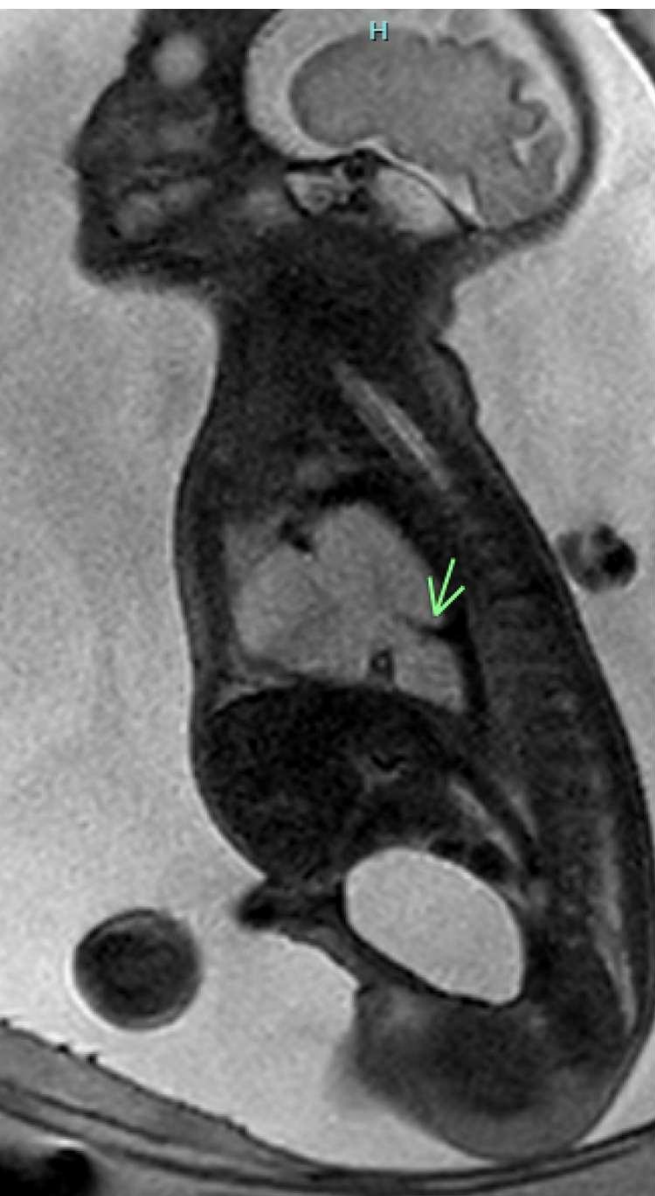
October 9 & 10, 2026



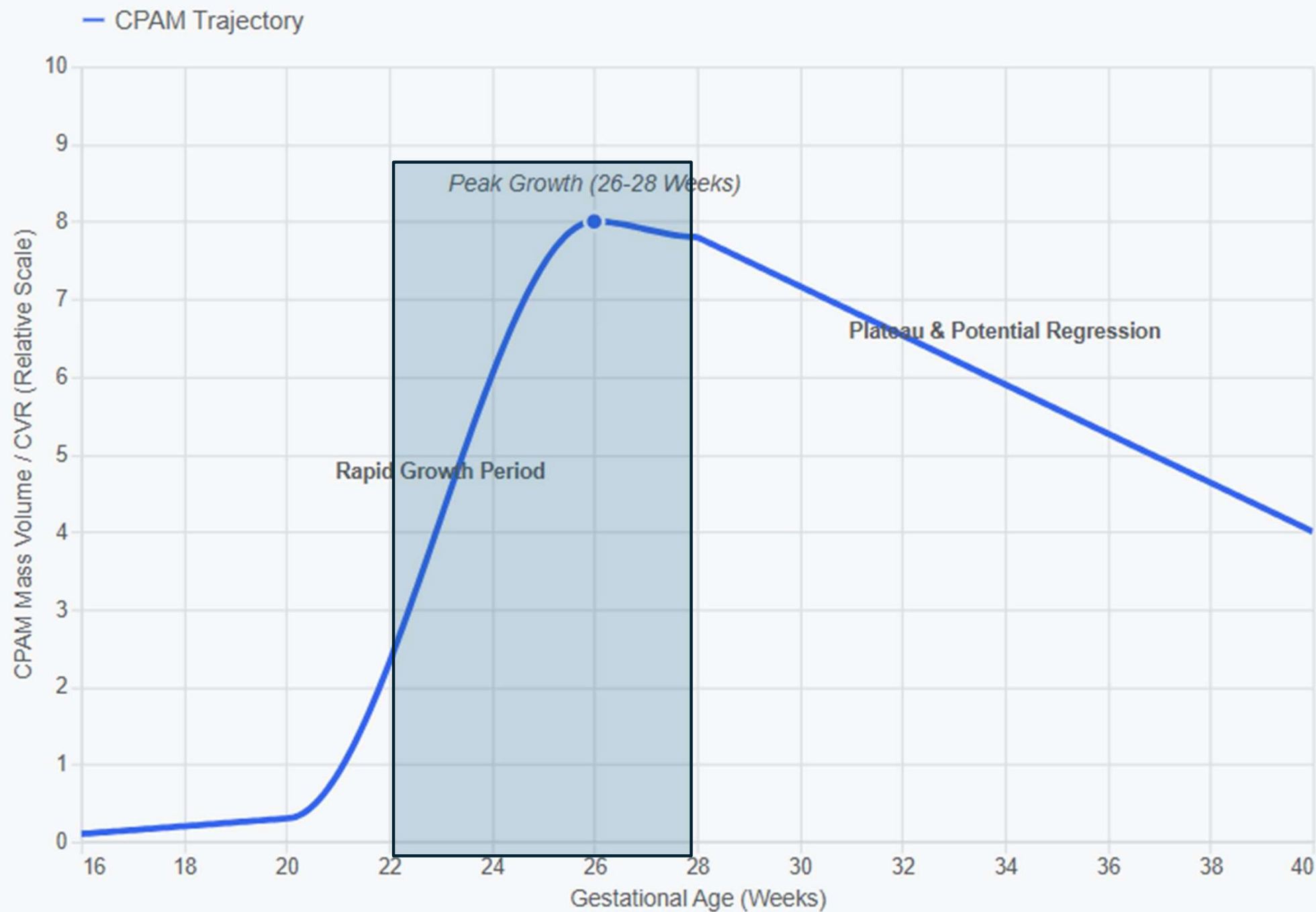
Case 1

- 27 yrs old G2 P1001 at 23w 6d referred for evaluation of a for lung mass vs congenital diaphragmatic hernia.
- US:
 - Lung mass type: BPS
 - Lung mass location: Left lung
 - Mediastinal shift: Significant
 - Mass measurements: 5.3 x 4.1 x 4.5 cm
 - Lung mass volume ratio: 2.19
 - Systemic feeding vessel: Yes, off the descending thoracic aorta
 - Fetal Hydrops: None seen
 - AF Volume AFI 24cm



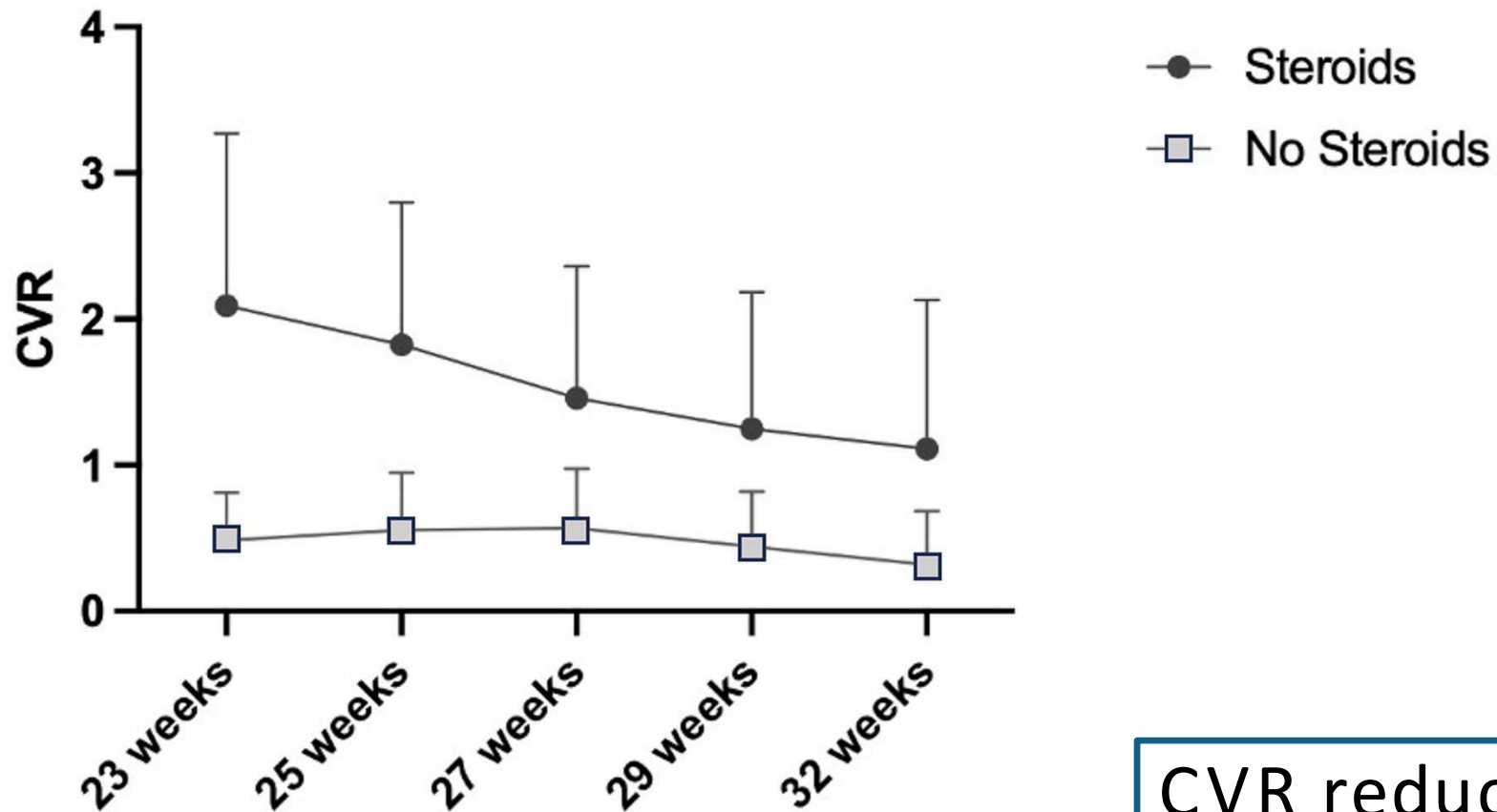


Typical CPAM Prenatal Growth Trajectory by Gestational Week

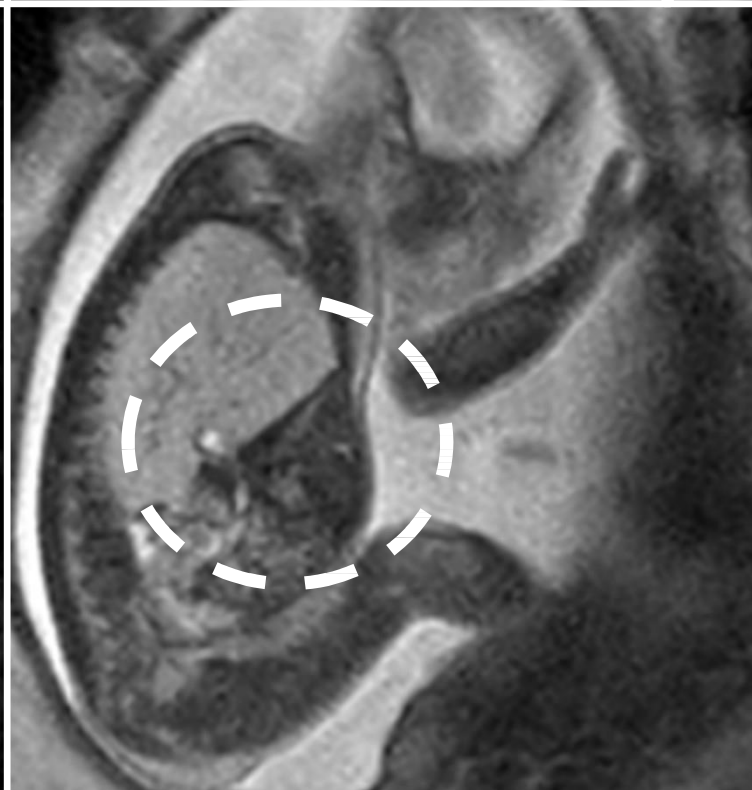
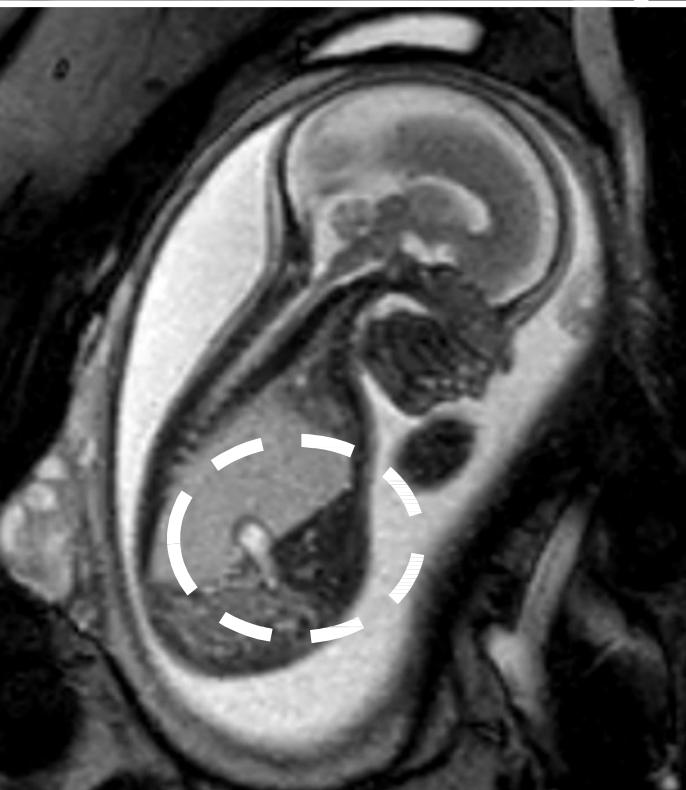
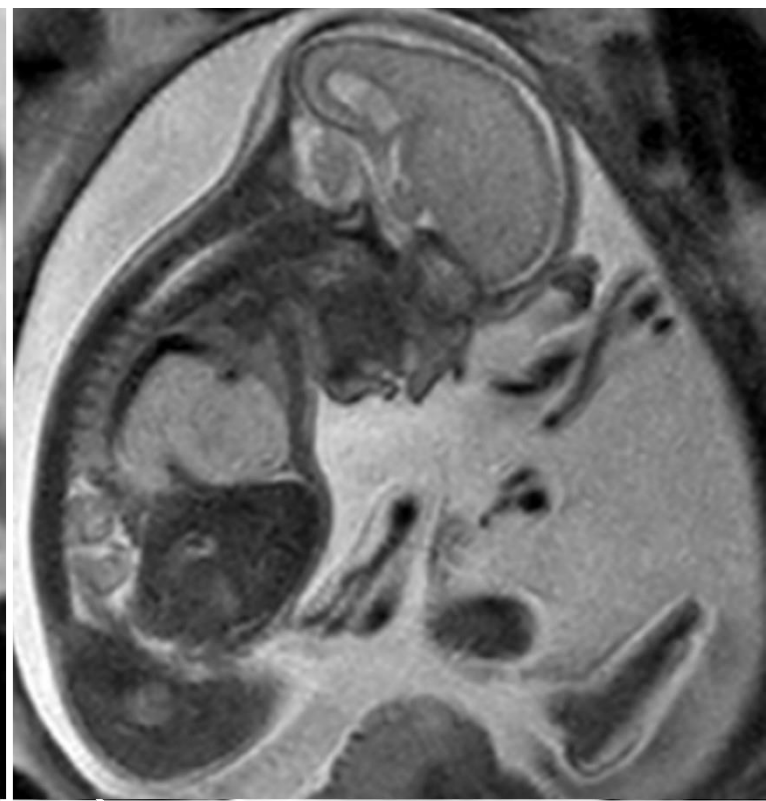
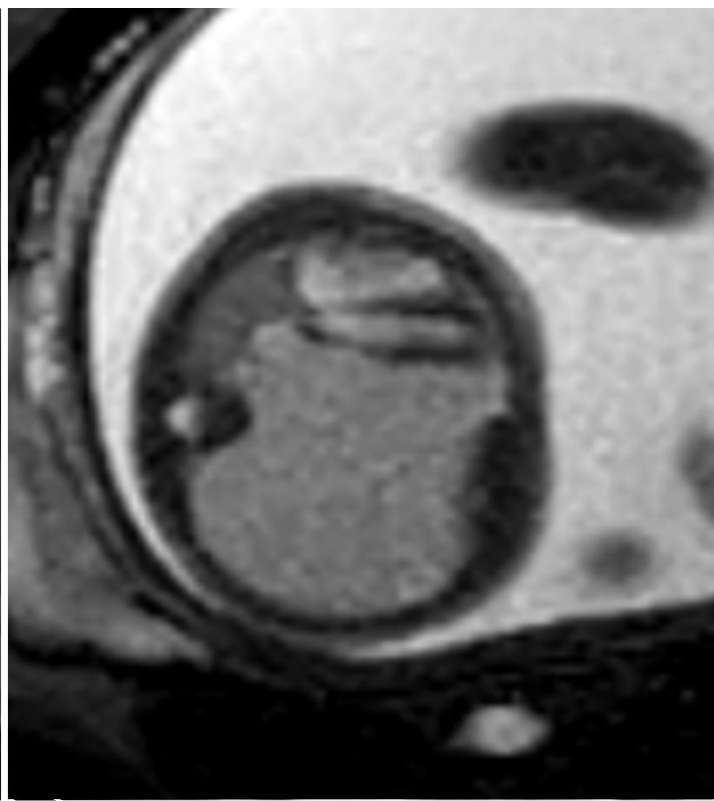


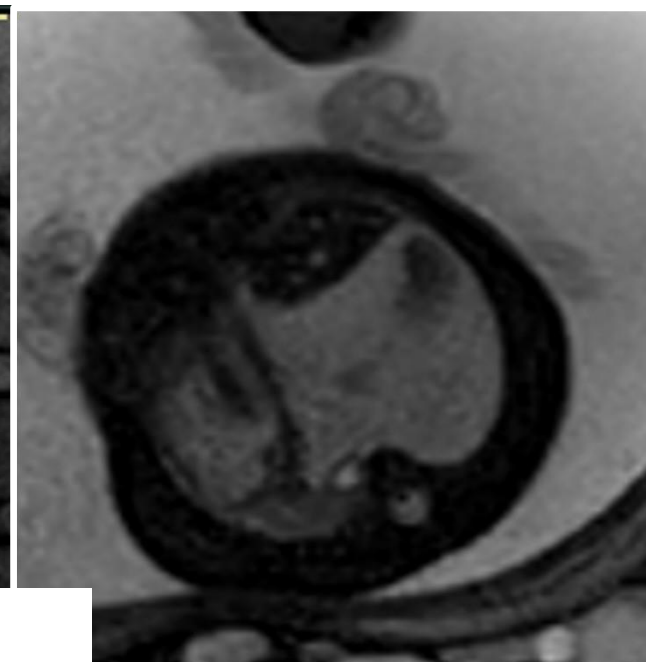
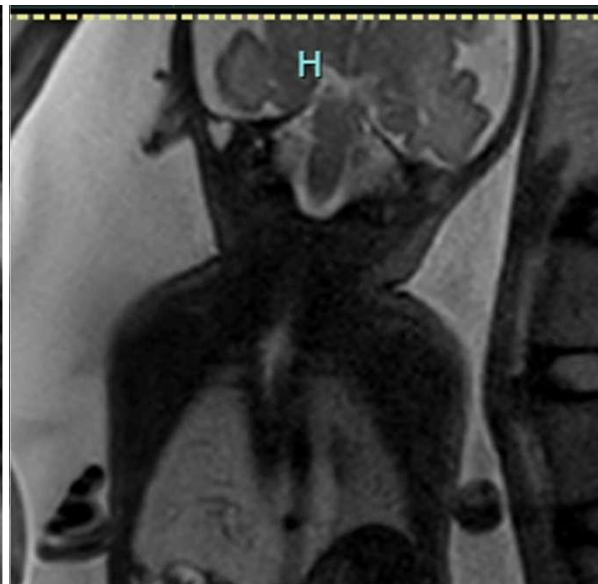
Case 1

CPAM Volume Ratios by Gestational Age

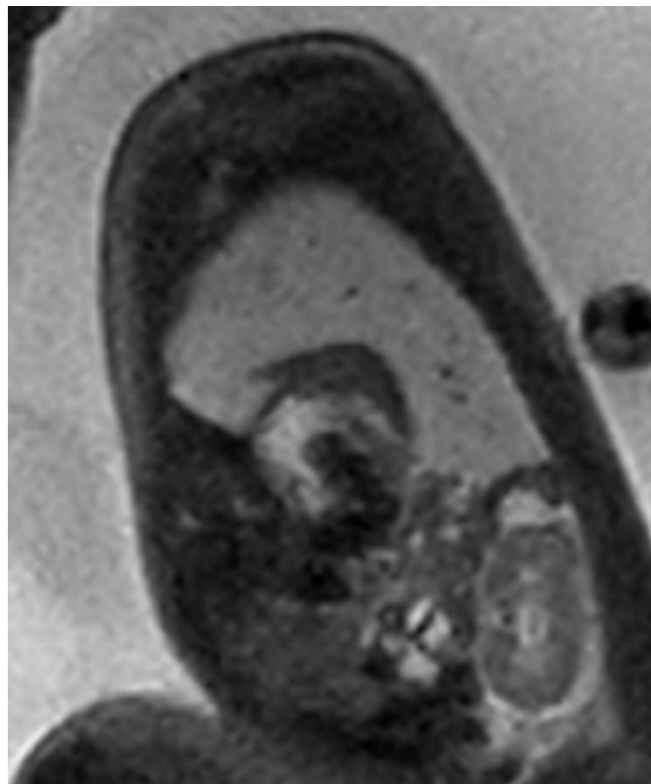


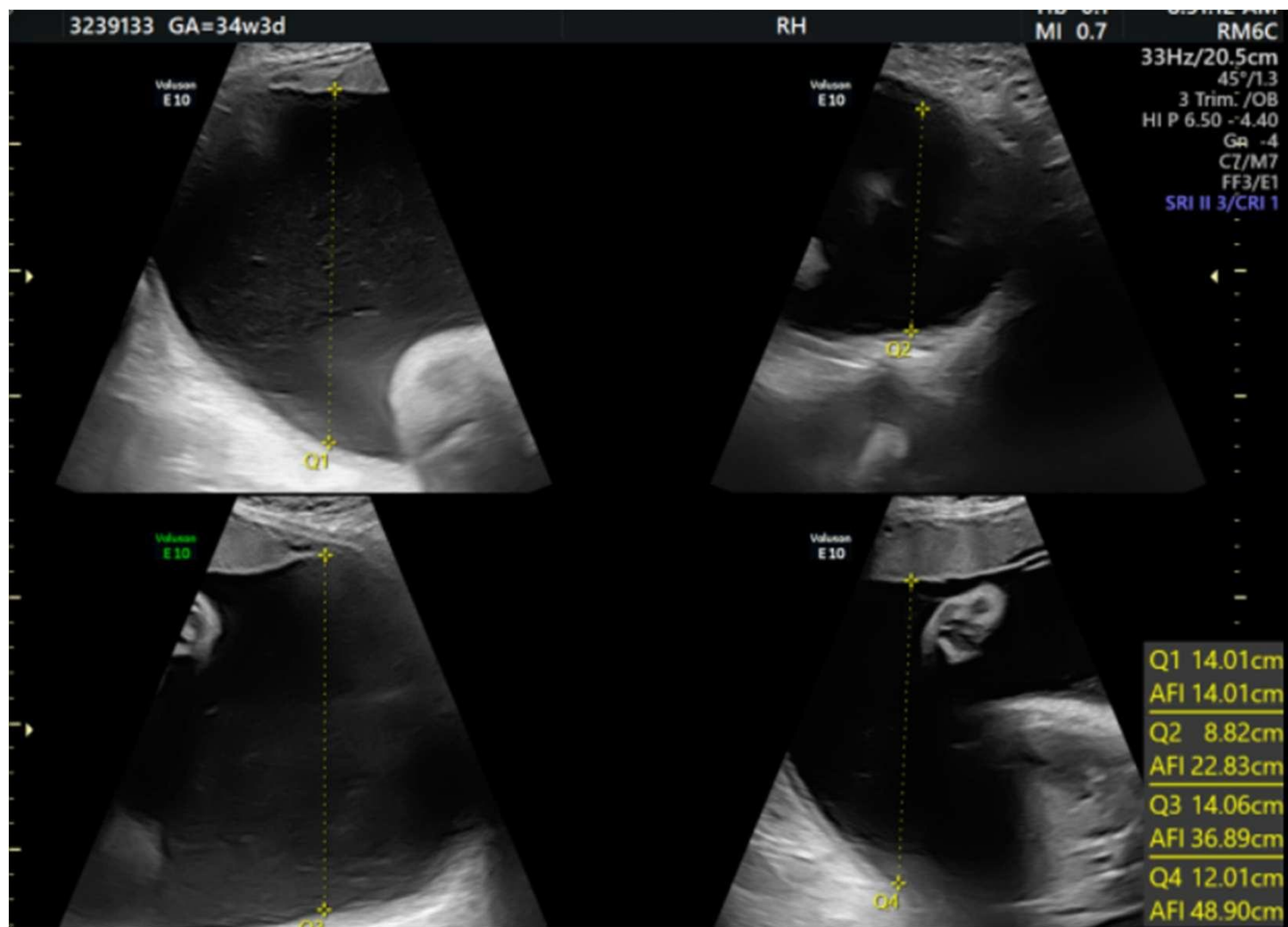
CVR reduction for those with BPS on pathology was only 0.1 ± 1.3





US O/E: 44%
MRI O/E: 27%

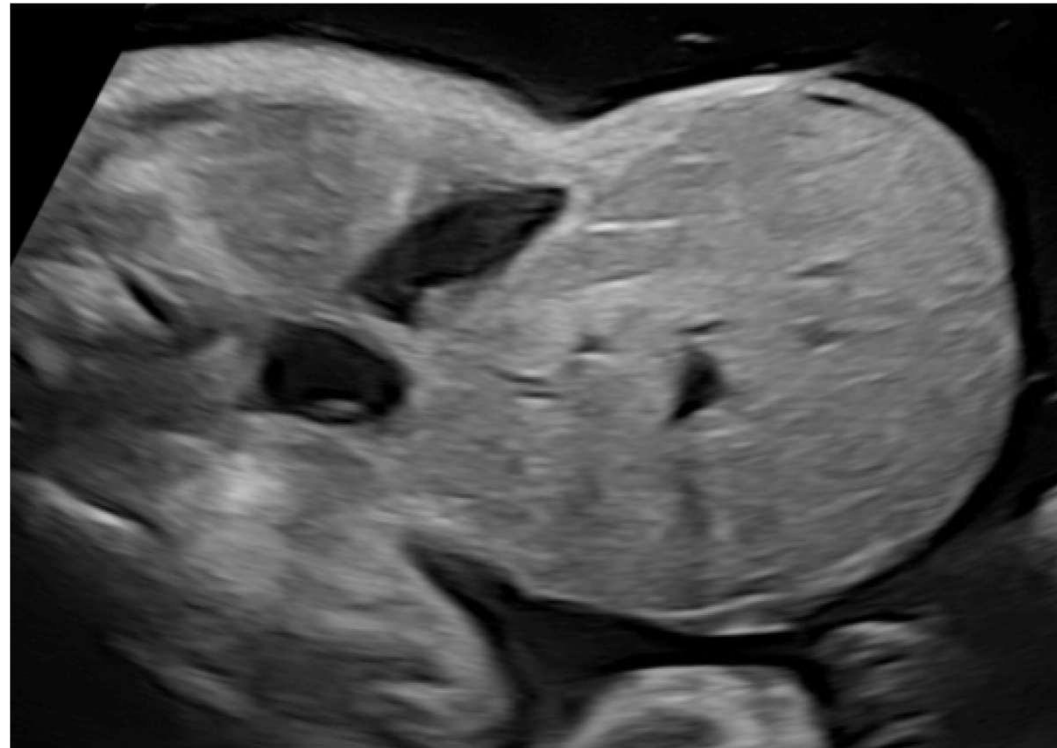




- Initial poly of 29ml at 23w had progressed to 49ml at 34w....AR of 2900ml...reaccumulated to 38cm at 36w
 - Genetics: CMA and WES - negative
- Scheduled repeat CS at 37w 6d
- Initially ventilated reasonably, but worsening hypoxia → ECMO

Case 2

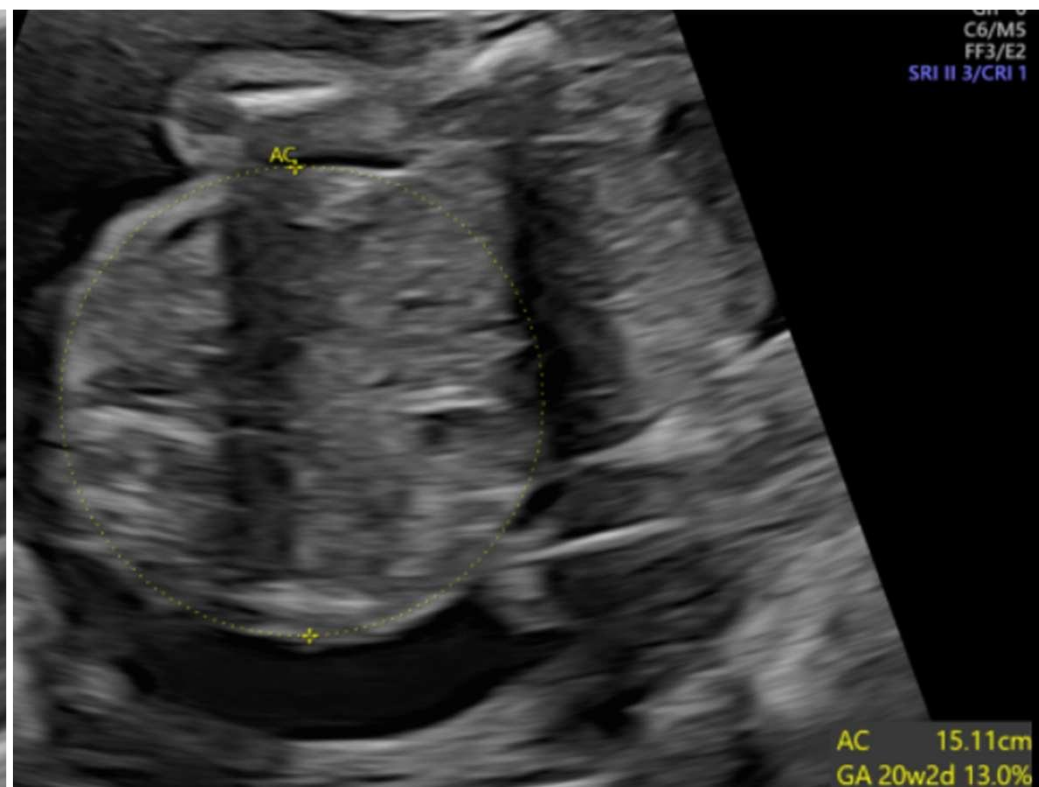
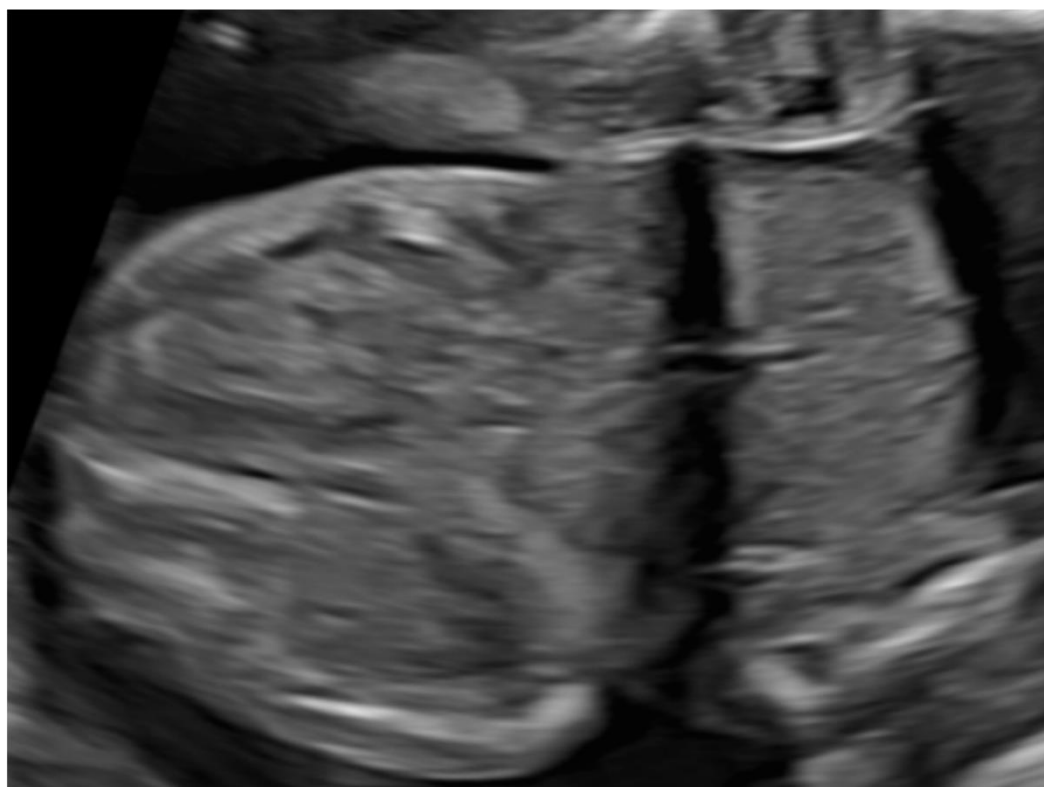
- 36 yrs old G1 P0 at 21w 3d referred to CFCC for fetal omphalocele.
- AGA fetus with
 - Giant Omphalocele containing liver, gallbladder, with stomach pulled anteriorly.
- Amnio: Normal CMA/WES

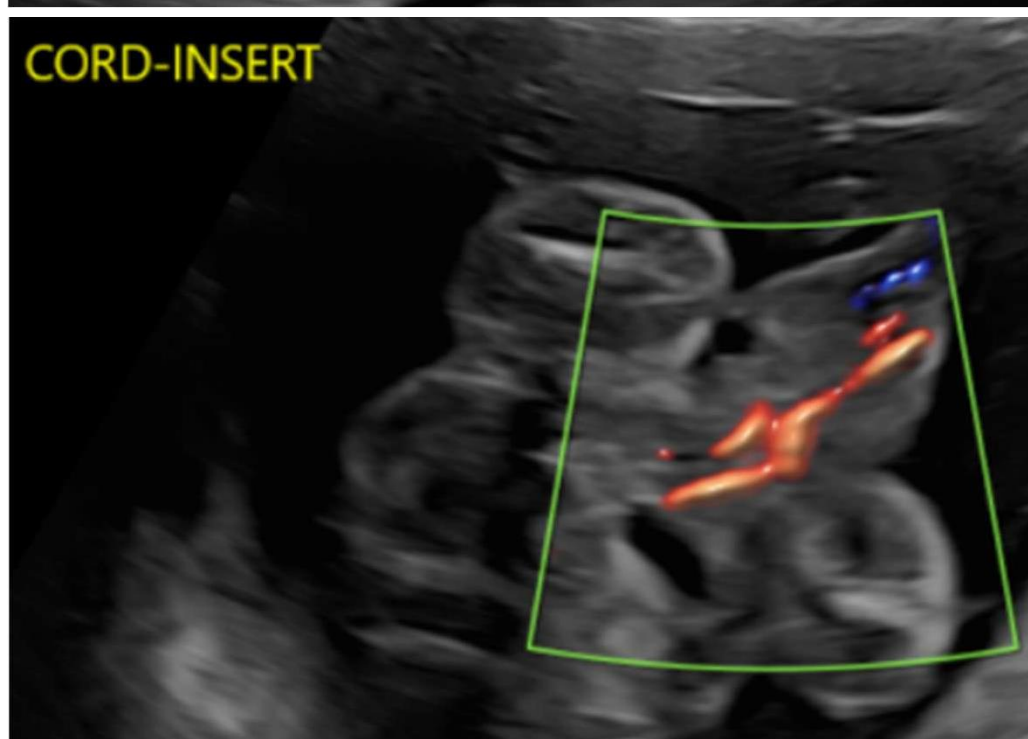
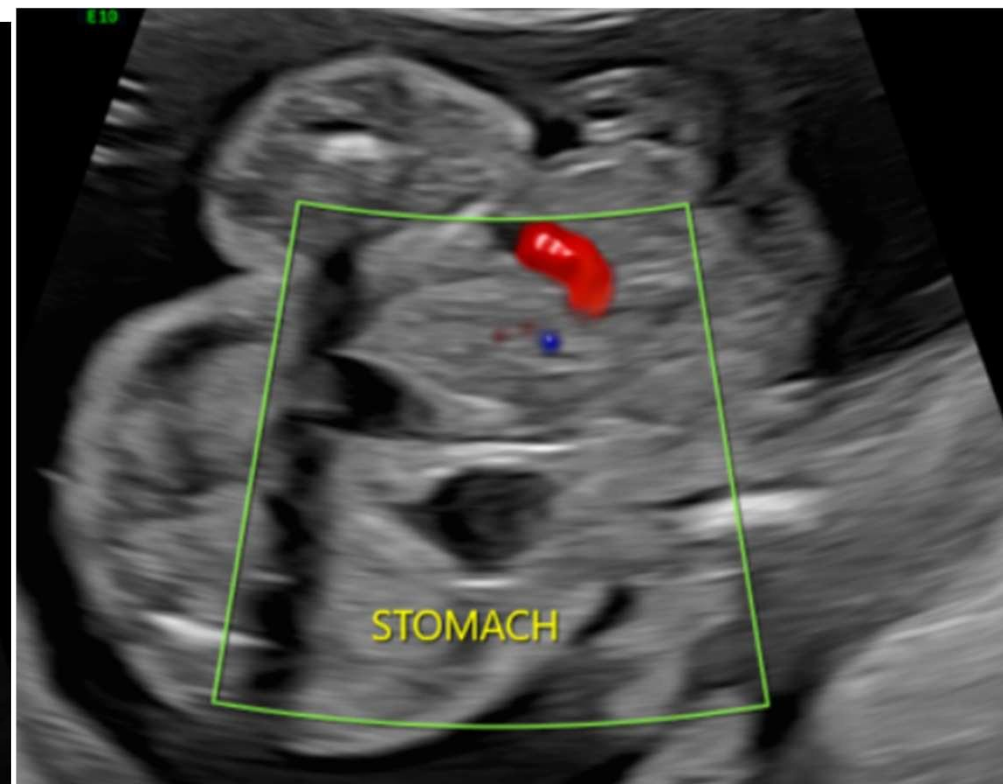
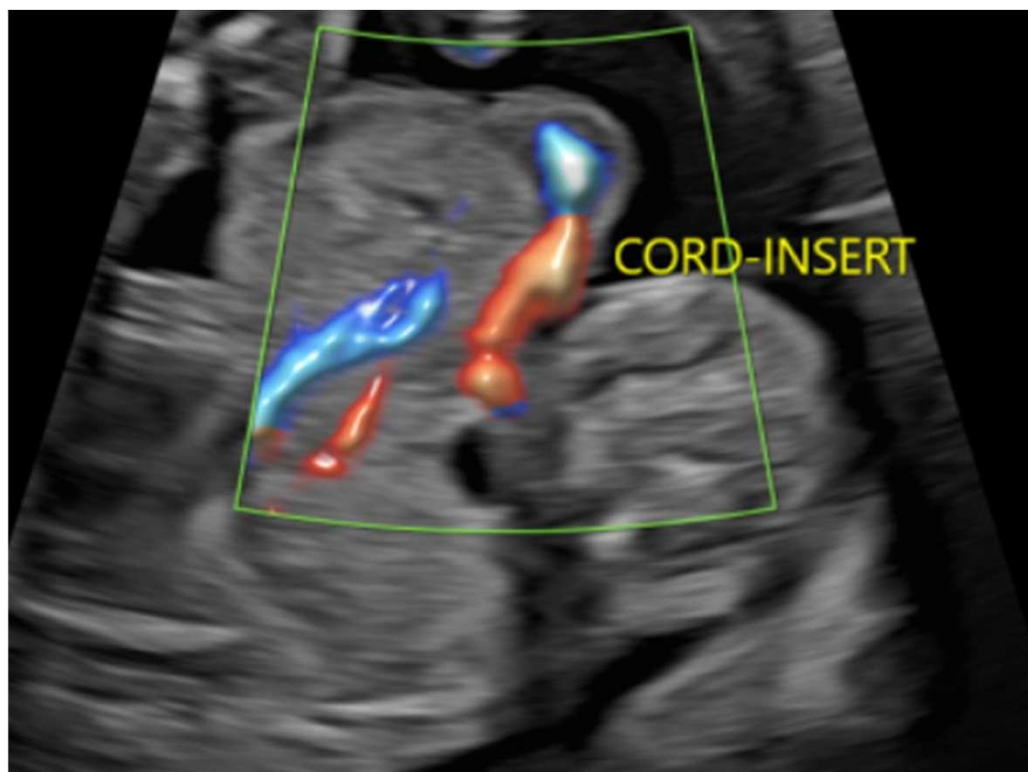


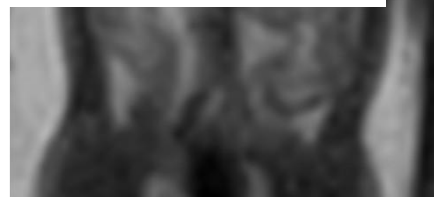
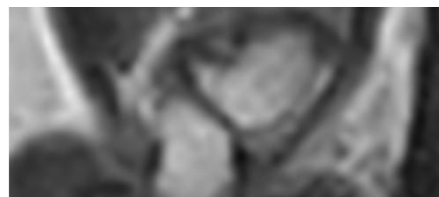
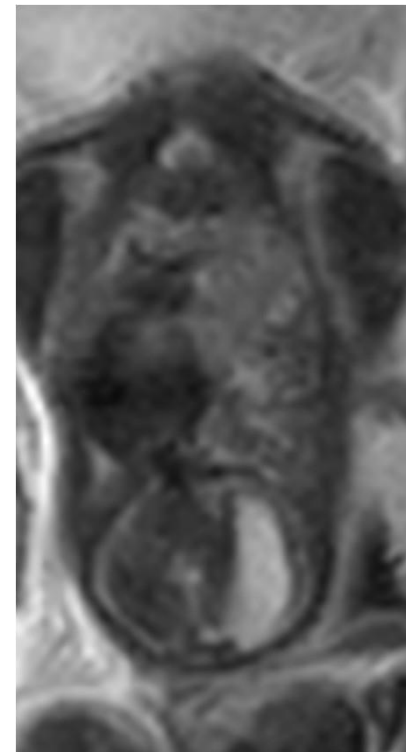
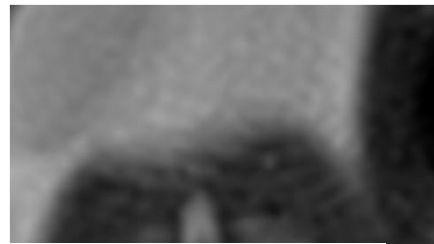
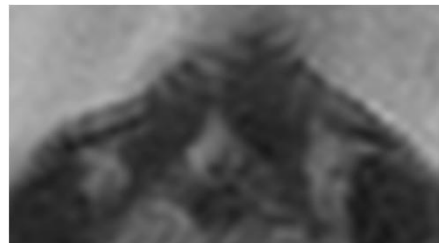
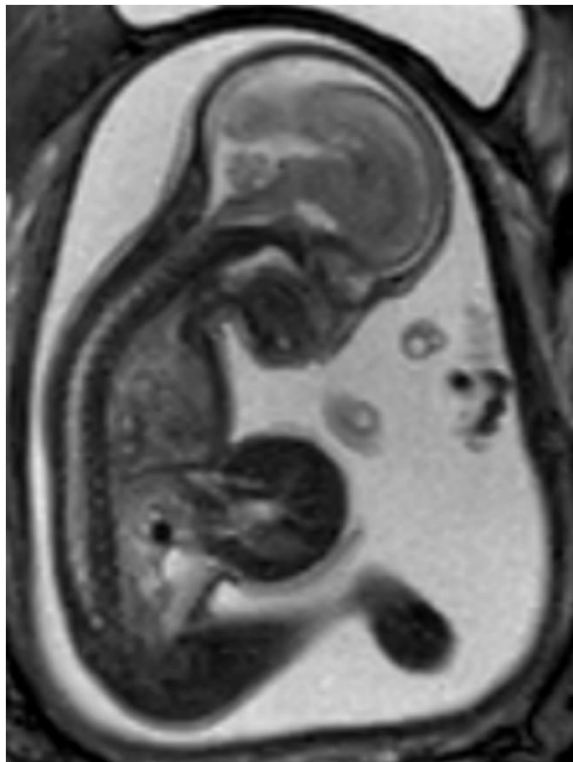
LMP		GA(EDD)	21w3d	EDD	09/29/2026	G		Ab	
DOC		GA(AUA)	21w2d	EDD(AUA)	09/30/2026	P		Ec	

EFW (Hadlock)		Value	Range	Age	Range	GP	Hadlock
AC/BPD/FL/HC		394g (14oz)	± 58g				24.8%

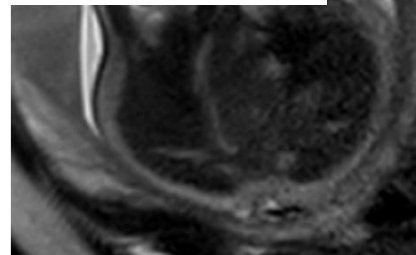
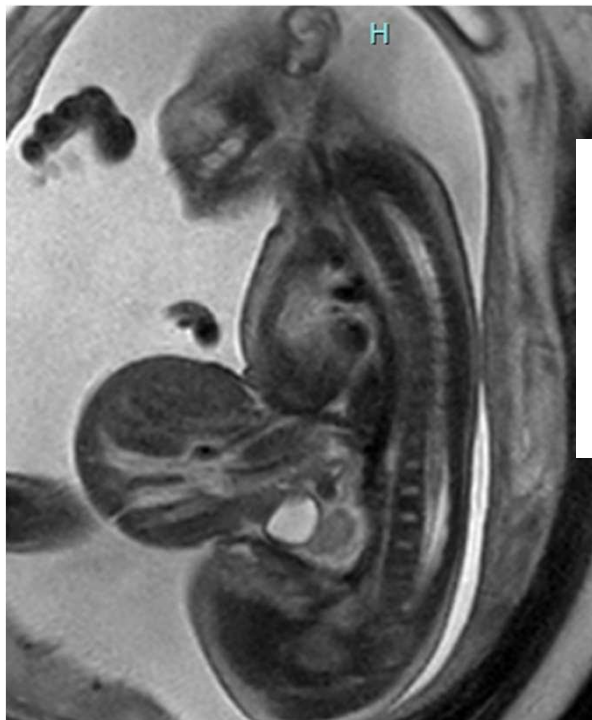
2D Measurements	AUA	Value	m1	m2	m3	Meth.	GP	Age
BPD (Hadlock)	☒	5.22 cm	5.22			avg.		64.9% 21w6d
HC (Hadlock)	☒	19.15 cm	19.15			avg.		38.5% 21w3d
AC (Hadlock)	☒	15.11 cm	15.11			avg.		13.0% 20w2d
FL (Hadlock)	☒	3.67 cm	3.67			avg.		48.8% 21w5d
HL (Jeanty)	☒	3.29 cm	3.29			avg.		34.7% 21w1d
Cereb (Hill)	☐	2.20 cm	2.20			avg.		38.8% 20w4d







24wk
US O/E: 35%
MRI O/E: 41%



34wk
US O/E: 42%
MRI O/E: 47%

Case 2

- CDH Evaluation

–Location:	Left
–Contents:	Bowel
–Mediastinal Shift:	Yes
–Liver Herniation:	No
–Stomach Dilation:	No
–Hydrops:	No
–LHR O/E:	34.7%

Case 2



- Relocated at 33 wks
- C/S scheduled at 38 wks
- PPROM at 36 wks → C/S

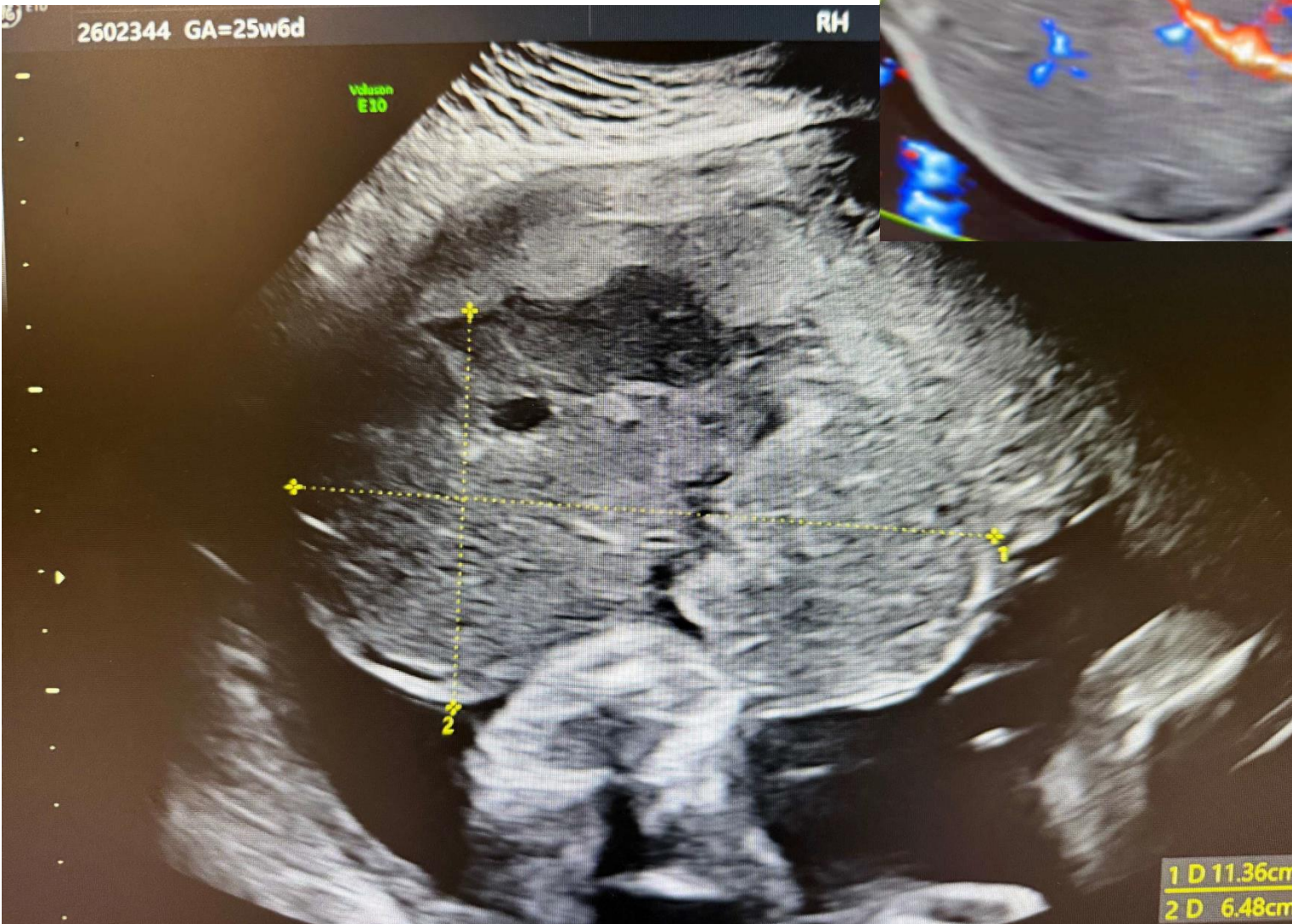
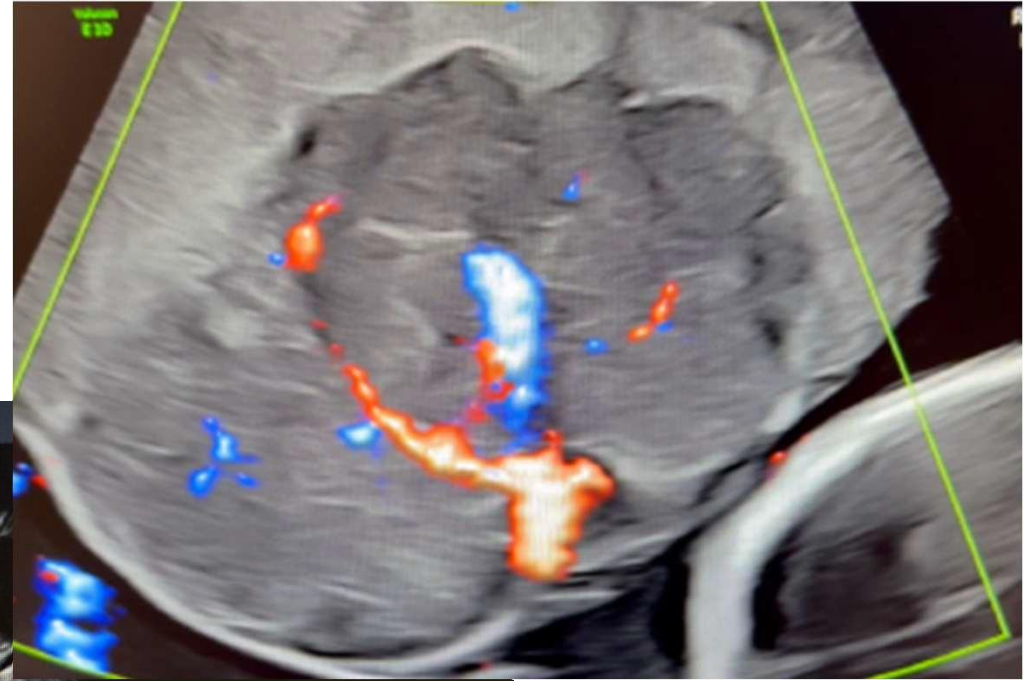
Plan

- Decannulate
- Thoracoscopic CDH repair
- Topical epithelialization and delayed GO closure

Colorado 2026 Data

- 23 patients over past 8 months (anticipate 30 by end of year)
- ~35% severe cases; ~20% complex (coarc, portosystemic shunt..)
- Survival = 100%
- Rarely offer FETO
- Team Evolution
- Focused on minimizing comorbidities and ECMO related complications

Case series (n=7)



Percutaneous Ethanol Chemosclerosis of Complicated Giant Chorioangioma

Henry L. Galan, MD, Nicholas Behrendt, MD,
Abby Larson, MD, Sarkis C. Derderian, MD and
Mike V. Zaretsky, MD



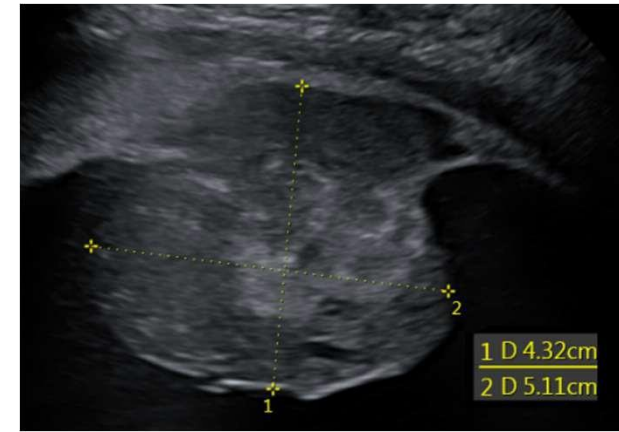
Colorado Fetal Care Center
Children's Hospital Colorado



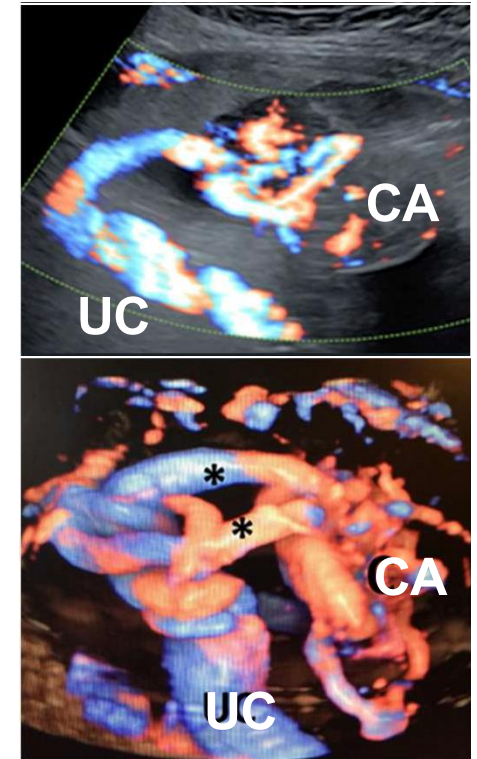
Colorado Fetal
Care Center



- Chorioangiomas (CA)
 - Small & benign tumors
 - 1% of placenta pathologic exams
 - When >4cm diameter → “Giant” CA



- Giant CA:
 - Rare (1:9000-1:50,000); variably vascular
 - Significant risk to the mother and fetus:
 - Fetal anemia and thrombocytopenia,
 - FGR
 - Heart failure (cardiomegaly; vent hypertrophy, ↑ CCO)
 - Hydrops, fetal demise
 - Mirror syndrome
 - Polyhydramnios → Short Cervix, PTL, PPROM, PTB



- Treatment indicated when complications develop

Treatment approaches:

- Delivery
 - Majority CA present at an early GA
- Adjunctive (palliative):
 - Amnioreduction + indomethacin
 - Digoxin (transplacental)
 - Fetal intrauterine transfusion
 - Cerclage
 - Propranolol
- Definitive (devascularize):
 - Fetoscopic: laser, cautery, ligation, clip
 - Radiofrequency ablation
 - Percutaneous injection of a sclerosing or occlusive agent: enbucrilate, coils, EtOH

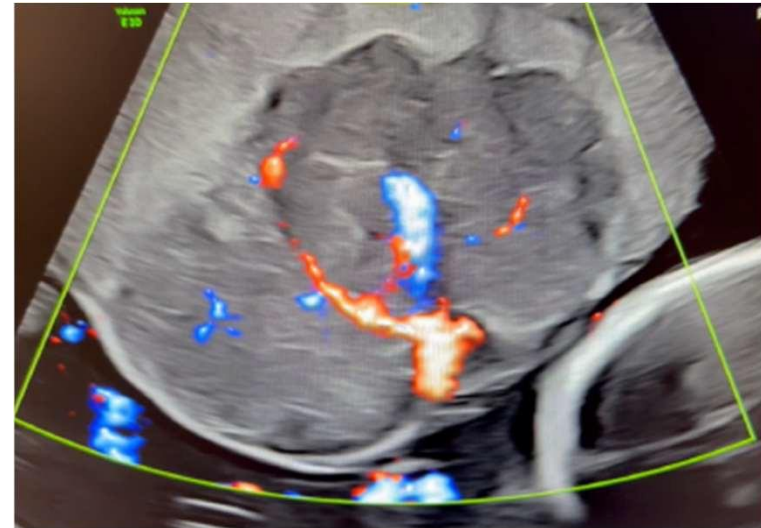
Al Watter et al. JMFNM, 2014; Lim et al. Fetal Diagn Ther, 2015; Deihl et al. Pregnancy. 2026

Ethanol: minimally invasive, agent accessible, effective in a few reported cases

Nicolini, Lancet 1981; Ellman, Radiology 1981, Deren, Fetal Diagn Ther 2007; Ercan, Fetal Pediatr Path, 2012; Wannapirak, 2002;

Methods

- Retrospective study
- Chart review
- Cases with complicated giant chorioangiomas.
- 2018-2026
- Outcomes assessed for seven cases that underwent ultrasound-guided percutaneous intratumoral injections of 2-5cc of 100% EtOH via 20g or 22g spinal needle.



Results

Patient Characteristics		
		Range
Number of Cases	7	-
Maternal Age (years; mean)	26.3	21-41
Race (n)	Caucasian	4
	Hispanic	3
Nulliparity	3	-
GA at Presentation (weeks; mean)	25.1	20.7-29.7

Ultrasound Findings (n=7)

	Mean	Range
CA Max Diameter (cm)	7.8	5.1-11.1
Tumor Volume (cm ³)	202.2	53.6-421.5
AFI (cm)	32.1	18-52
MVP (cm)	10.2	6.0-14.8
CT Ratio	0.6	0.54-0.69
CCO (ml/min/kg)	741.5	493-1216
MCA PSV MOM	1.8	1.2-2.3
EFW percentile	54.3	21-83

- Placenta location anterior (4)
- Short cervix <2.5 (2)
- Hydrops (1 w skin edema)

Case	Cardiomegaly	High CCO	Poly	Anemia	Short Cx	Hydrops
1	x	x	x	x	x	
2	x	x	x		x	x*
3	x	x	x	x		
4	x	x	x	x		
5	x	x	x	x		
6	x	x		x		
7	x	x	x			
Total	7/7	7/7	6/7	5/7	2/7	1/7

- Most cases had 4 or more complications.

* Skin edema only

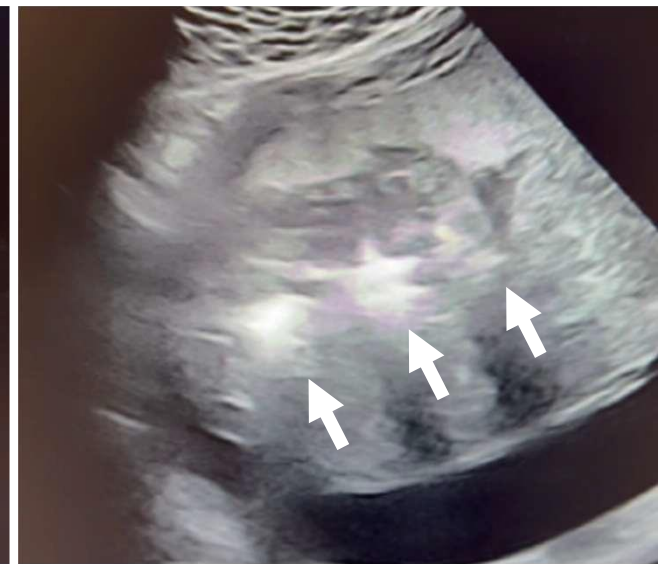
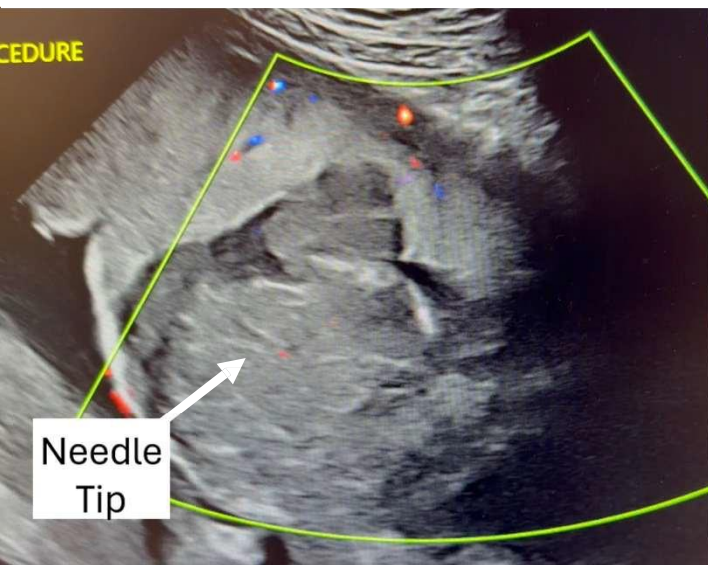
Treatment Details		
	N=7	Range
Mean GA at Treatment (weeks)	25.3	21.4-29.7
Amnioreduction (AR)		
One AR (n;%)	4	
Two AR (n;%)	2	
Mean Volume (ml)	1483.3	1000-2500
Intrauterine Transfusions (IUT)		
One IUT (n; %)	4	
Two IUT (n; %)	1	
Mean Opening Hct (%)	26.9	25.1-32.0
EtOH Treatment		
Two EtOH Treatments	3	
Mean Volume (cc)	3.2	2-5

- 3 cases with transient fetal bradycardia
- 1 case with preterm contractions

Delivery Outcomes				
Case	GA at Treatment	GA at Delivery	Latency (Tx to Del)	Birth Weight (g)
1	21.4	37	15.6	2794
2	29.7	35	5.3	2992
3	23.9	36.3	12.4	2720
4	27	33.1	6.1	1814
5	26.7	34.3	7.6	2023
6	22.7	35.7	13	2097
7	25.9	37	11.1	3360
Mean	25.3	35.5	10.2	2542.9
Range	22.7-29.7	33.3-37	5.3-15.6	1814-3360

- Newborn sex: 3 female, 4 males
- Newborn 5' Apgar score: all 8 or 9

Technique

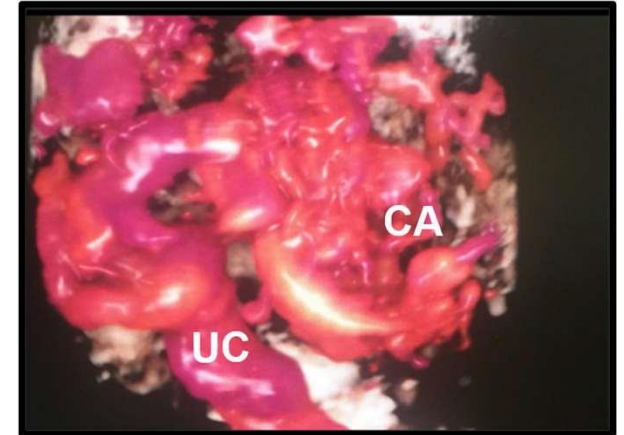


Postop US

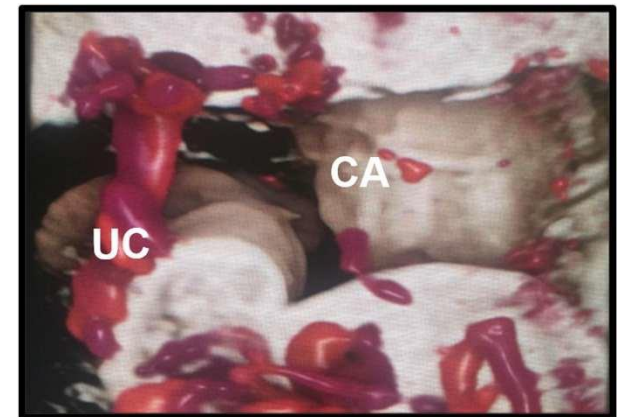


All tumors showed e/o devascularization

Pre-
treatment



Post-
Treatment



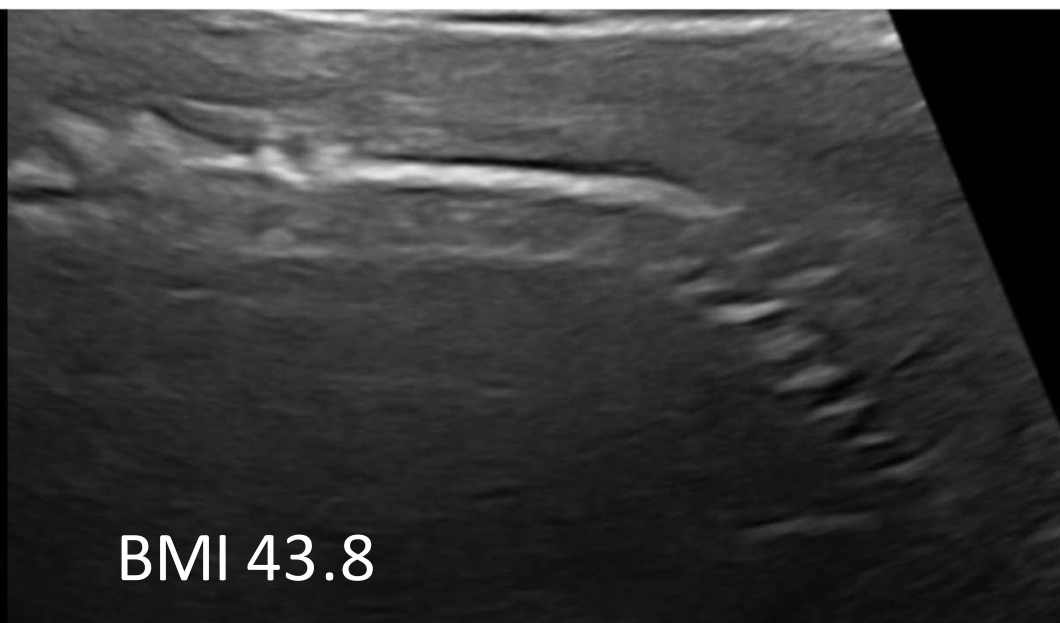
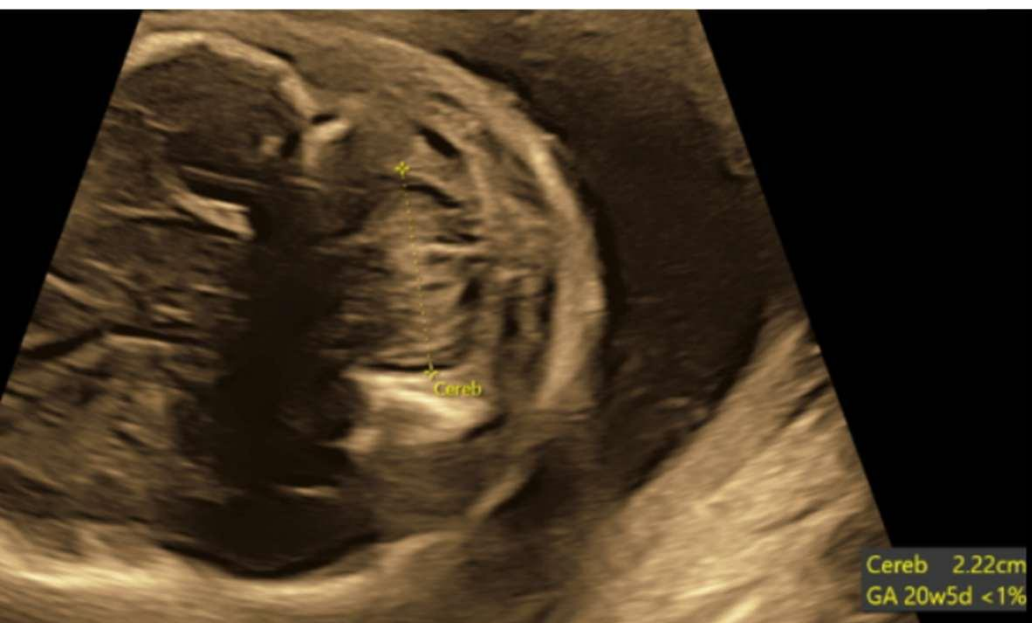
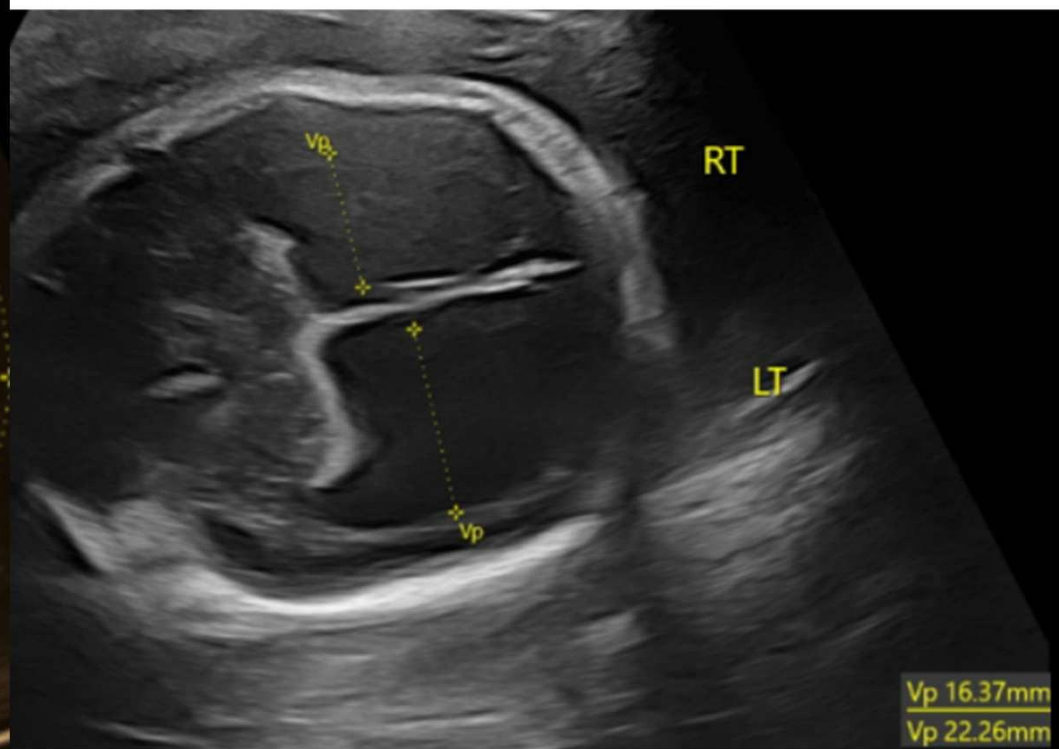
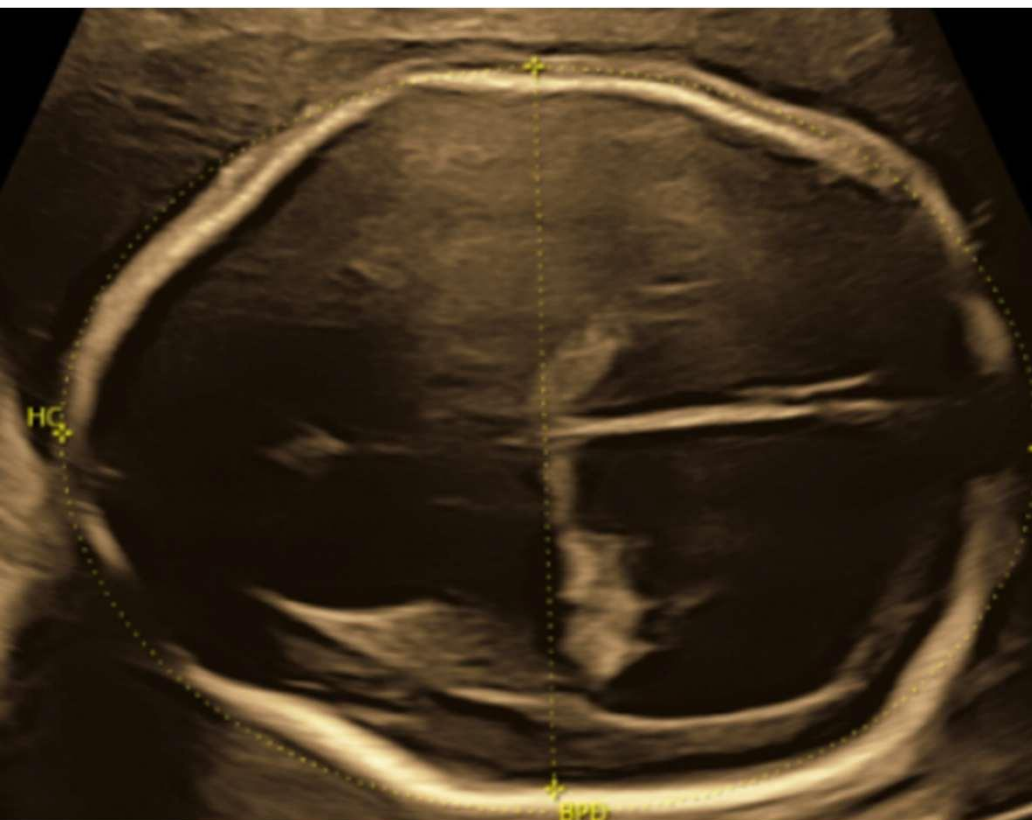
(3D power color Doppler/HD Live Flow)

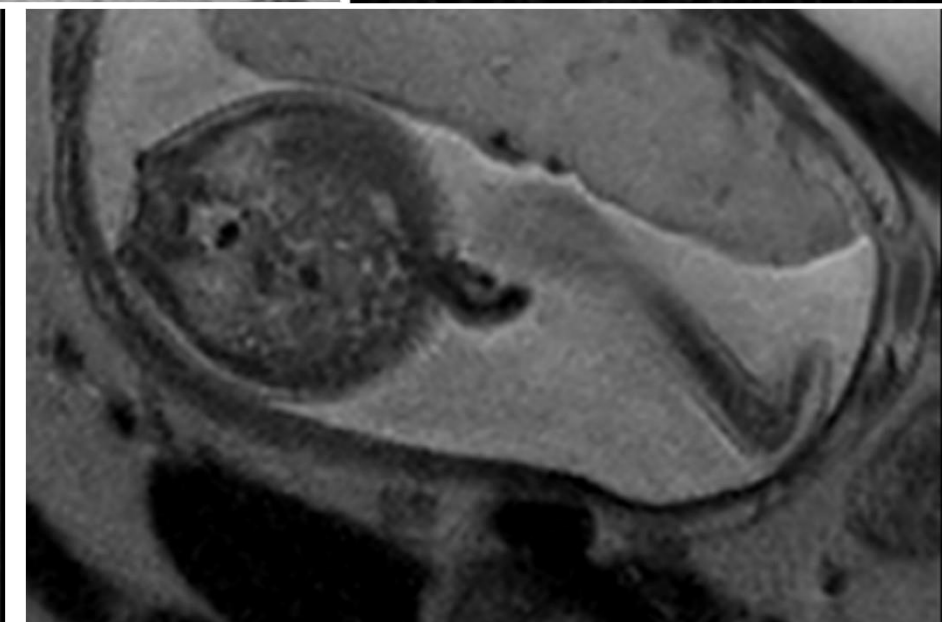
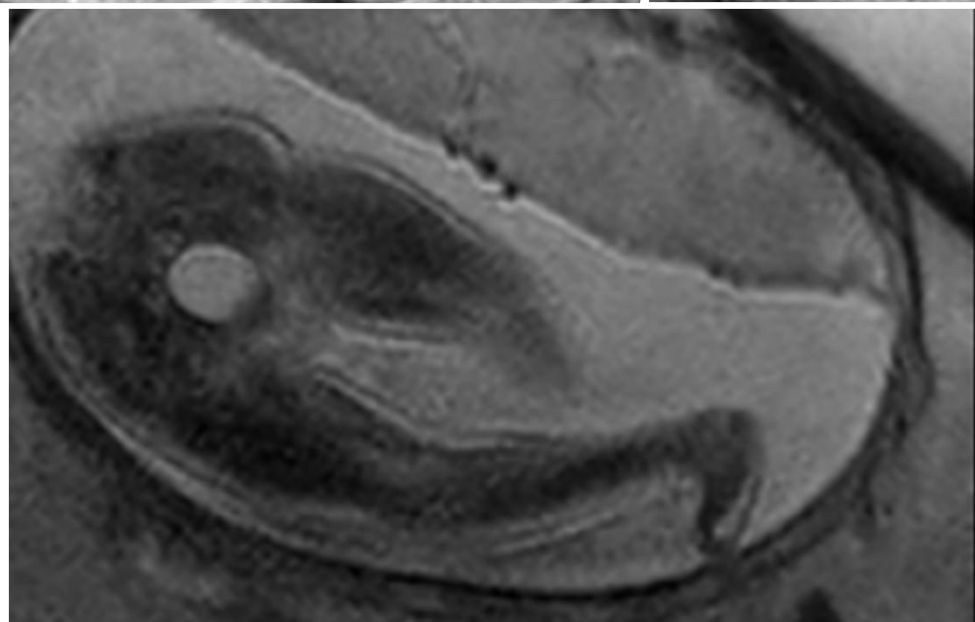
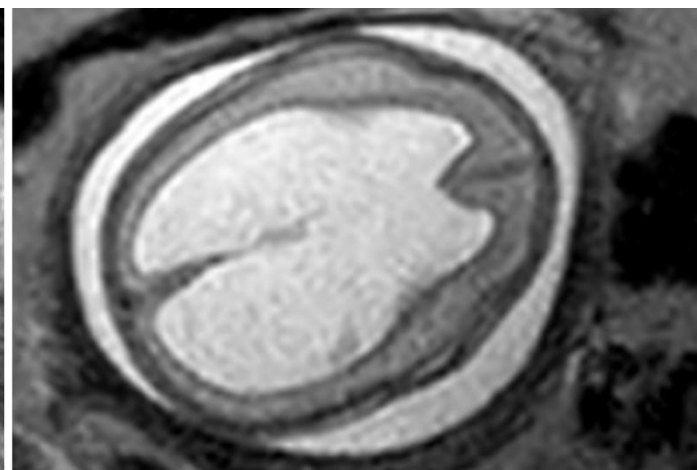
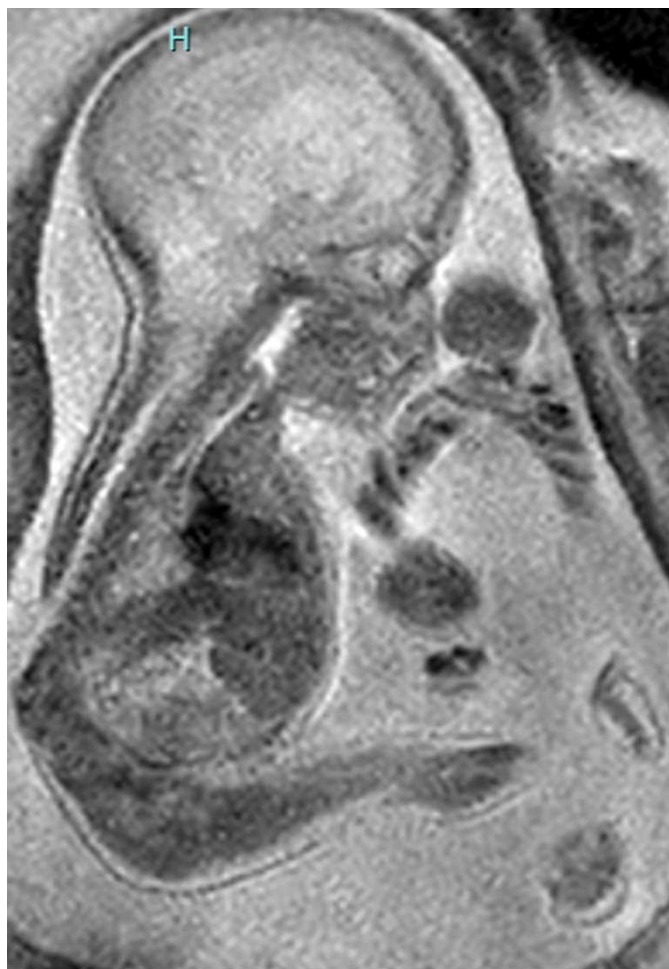
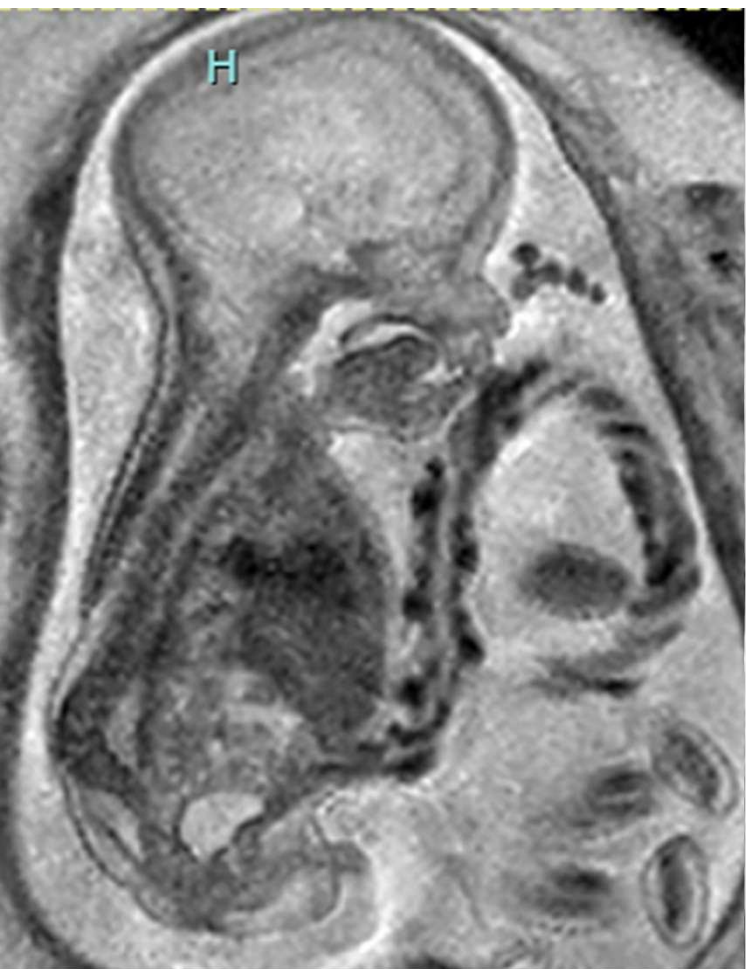
Conclusions

- CA cases presented in the very early preterm/periviable period with multiple complications.
- Ethanol is an effective sclerotic agent
 - Results in tumor necrosis and devascularization with pregnancy prolongation.
 - No serious complications encountered.
 - Injection into avascular areas may reduce absorption by fetal-placental unit.
 - Advantages:
 - Minimally invasive, ultrasound guided, day-surgery needle procedure.
 - Repeat procedures very feasible.
 - Ethanol agent accessible in any pharmacy.
 - Does not require referral to a fetal surgery center.

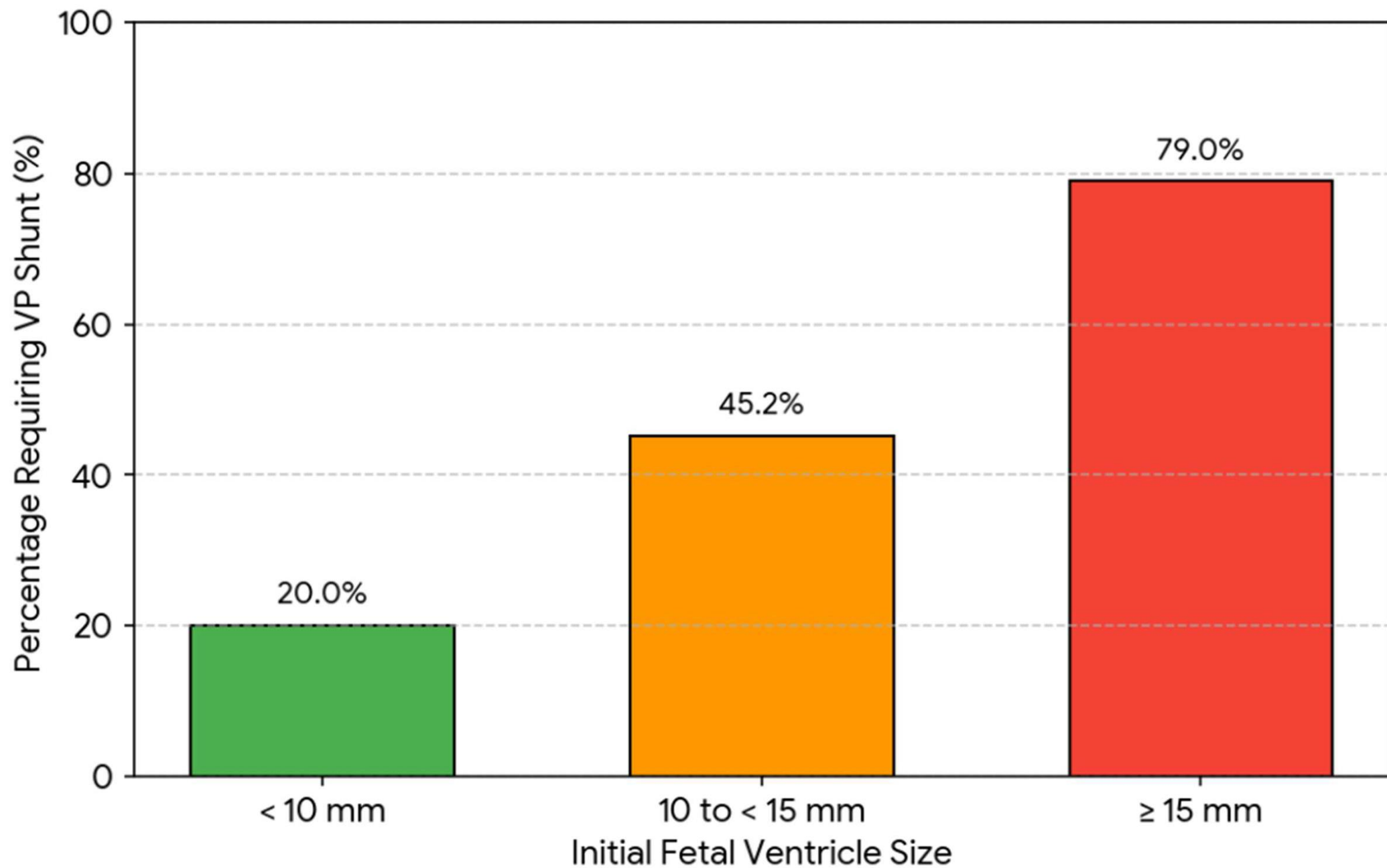
Case 4

- 24 yrs old G1 P0 at 25w 3d referred to CFCC for evaluation of a myelomeningocele.
- US: AGA fetus o/w normal anatomy aside from expected findings with a MMC
 - hind brain herniation c/w Chiari malformation
 - Lateral ventricles: 16 (Rt) and 22 (Lt) mm
 - Spine w/ open defect T10 through the entire sacrum; kyphosis
 - No skin covering
 - Feet with abnormal positioning
- MRI: Similar findings
 - Severe kyphotic L/S deformity (segmental spinal dysgenesis)
 - Multiple segmentation anomalies; foreshortening of the spine
 - Lower extremities w/ hypoplastic soft tissues and abnormal foot positioning suggestive of severe clubfeet/rocker-bottom abnormalities.
 - Abnormal meconium signal in the colon; secondary to severe spinal anomaly.





MOMS Trial: VP Shunt Risk by Ventricle Size
(Prenatal Surgery Group)

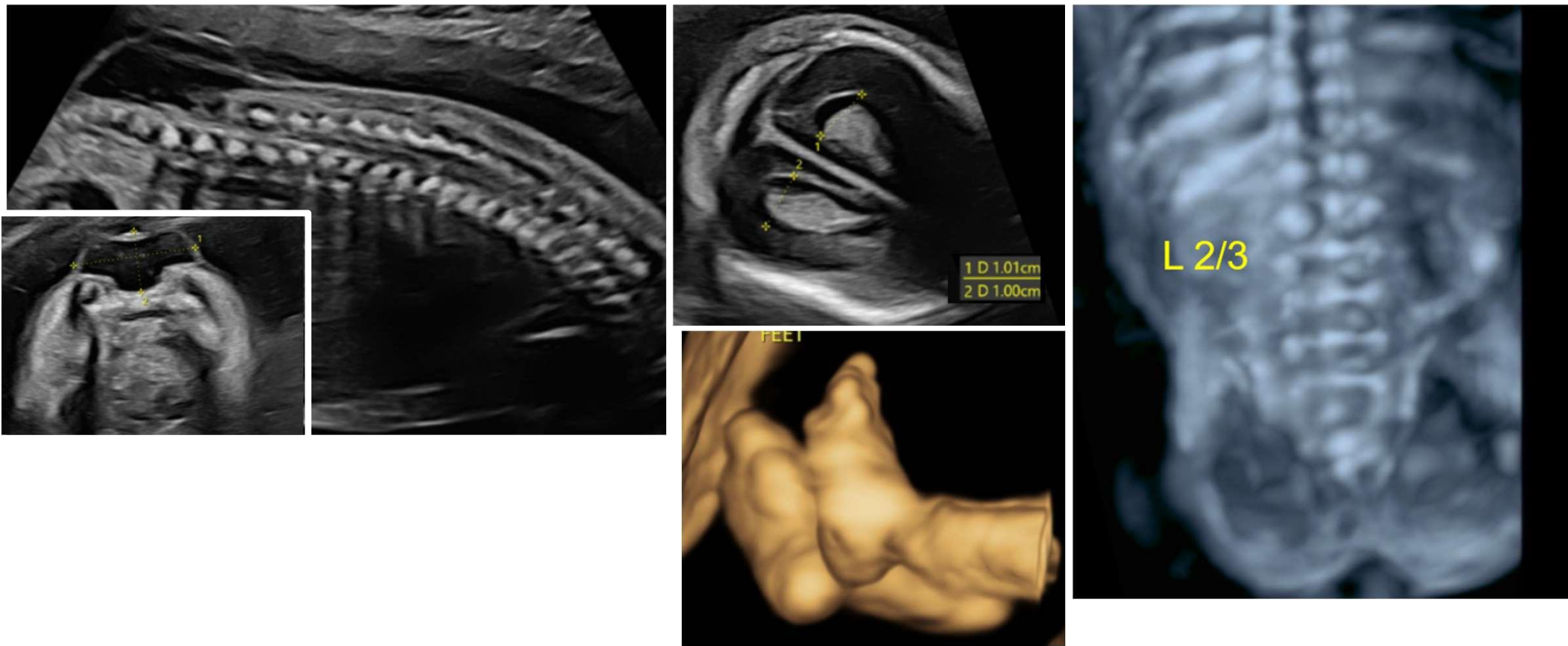


Case 5

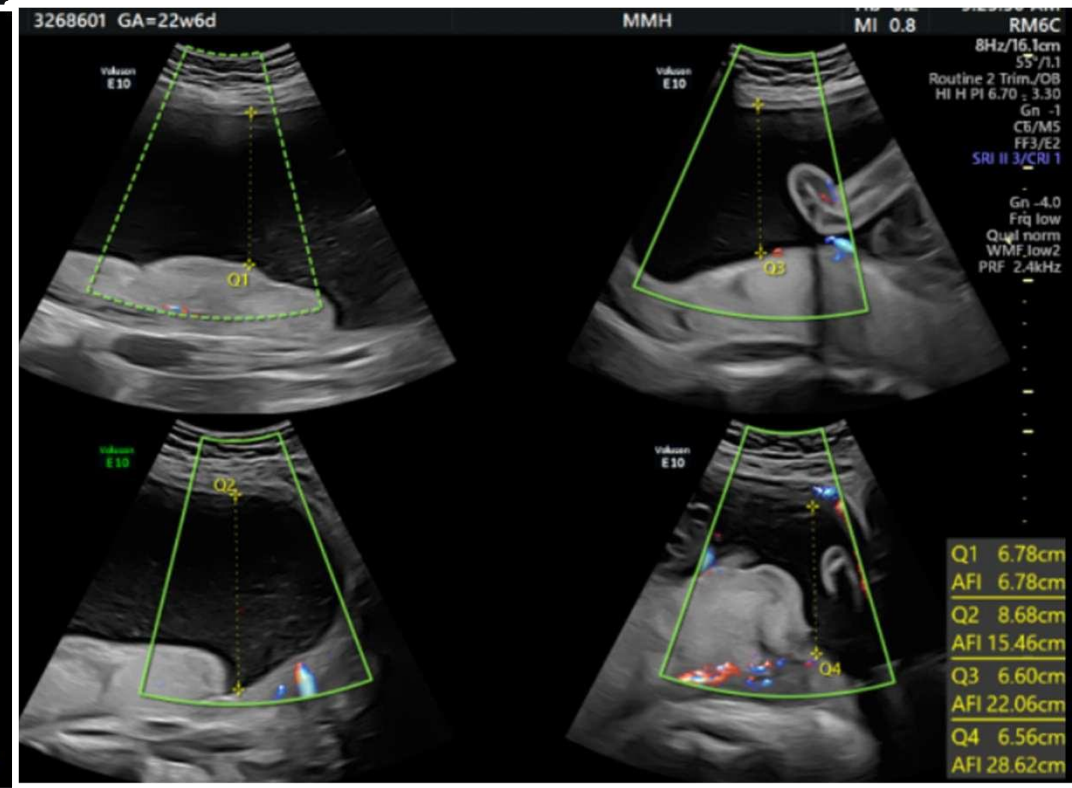
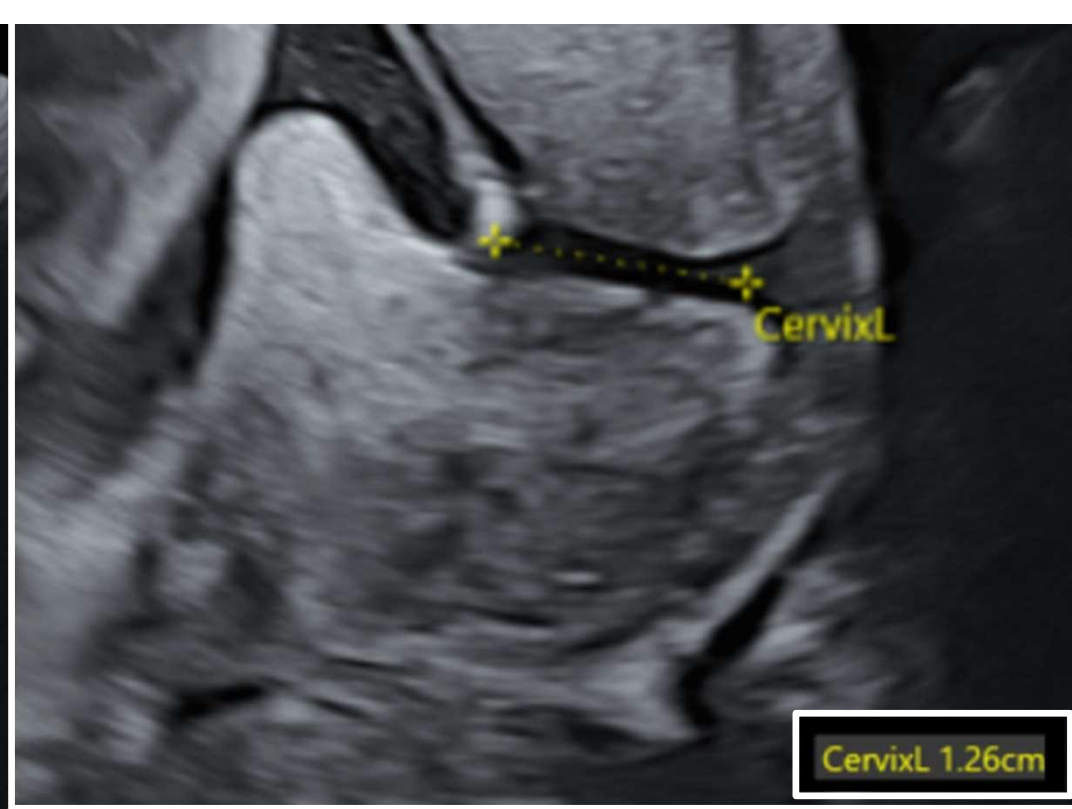
- 26 yrs old G2 P1001 at 22w 5d referred for spina bifida evaluation.

LMP		GA(EDD)	22w5d	EDD	12/11/2026	G		Ab	
DOC		GA(AUA)	21w4d	EDD(AUA)	12/19/2026	P		Ec	
EFW (Hadlock)		Value	Range	Age	Range	GP	Hadlock		
AC/BPD/FL/HC		499g (1lb2oz)	± 73g				27.4%		
2D Measurements	AUA	Value	m1	m2	m3	Meth.	GP	Age	
BPD (Hadlock)	☒	4.71 cm	4.71			avg.		<1%	20w2d
HC (Hadlock)	☒	16.89 cm	16.89			avg.		<1%	19w4d
AC (Hadlock)	☒	18.95 cm	18.95			avg.		73.2%	23w5d
FL (Hadlock)	☒	3.69 cm	3.69			avg.		12.5%	21w5d
HL (Jeanty)	☒	3.63 cm	3.63			avg.		38.4%	22w5d
Cereb (Hill)	☐	2.04 cm	2.04			avg.		1.4%	19w4d
MVP		7.11 cm	7.11					avg.	

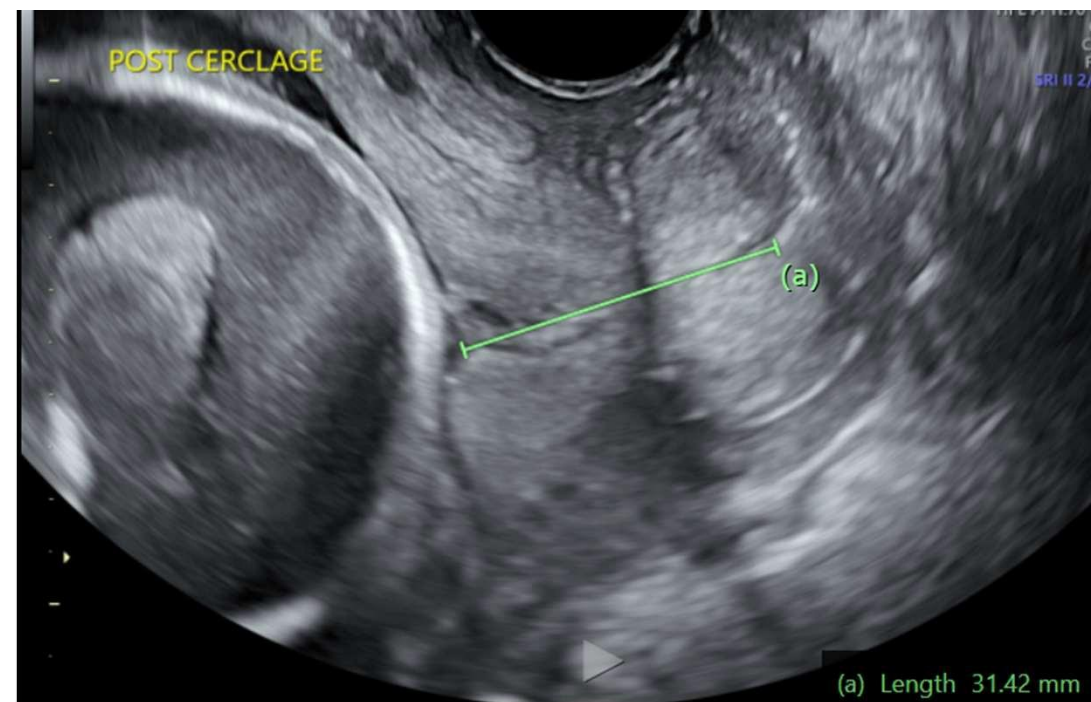
- Expected findings with a MMC



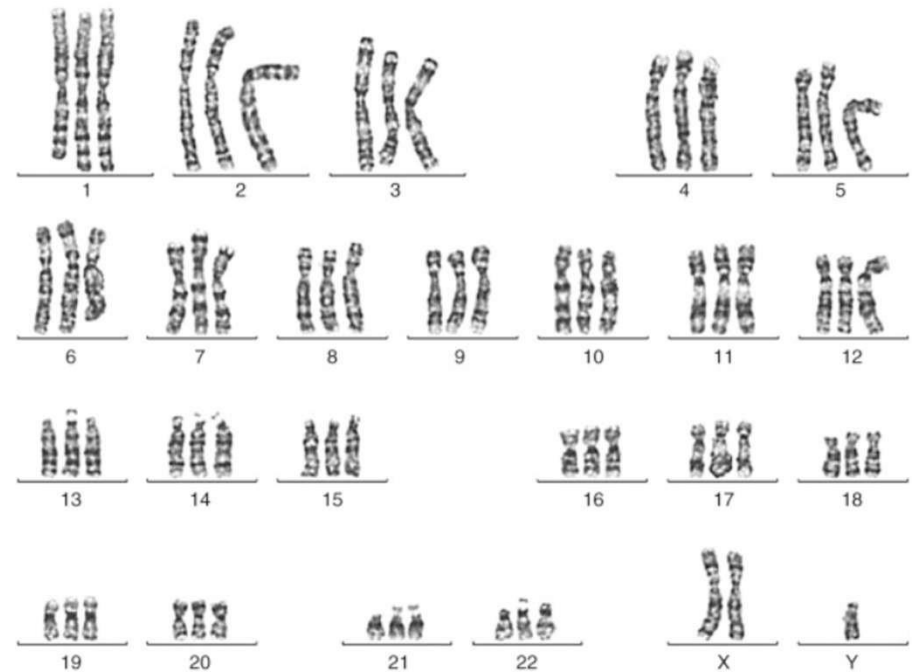
- Normal anatomy survey by US & MRI
- Normal Echo
- Good candidate...but,



- Amnioreduction 1200cc
- Cerclage
- Home to Kansas for OB care
- Plan to relocate to Denver area



- 2 days later, FISH showed triploidy & confirmed on karyotype



Triploidy Common US findings:

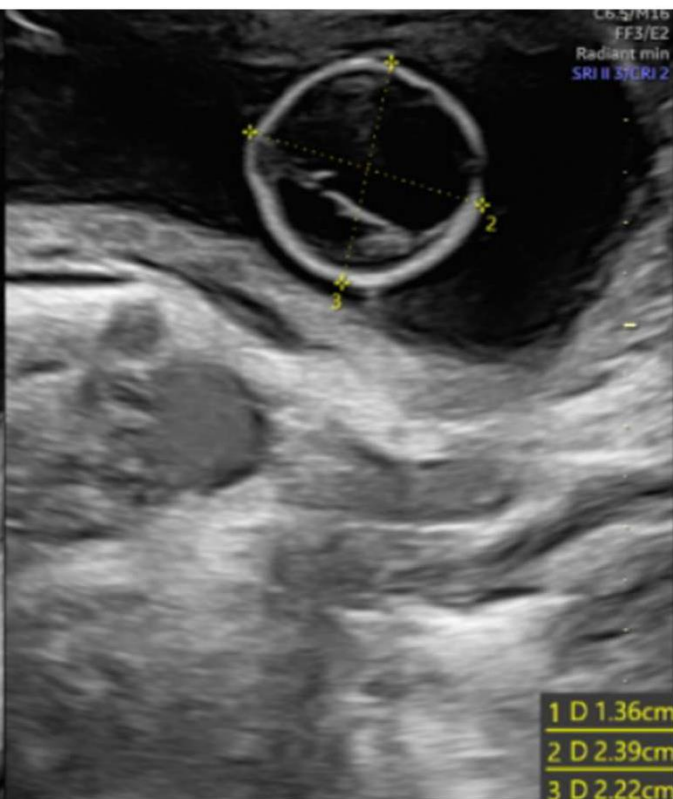
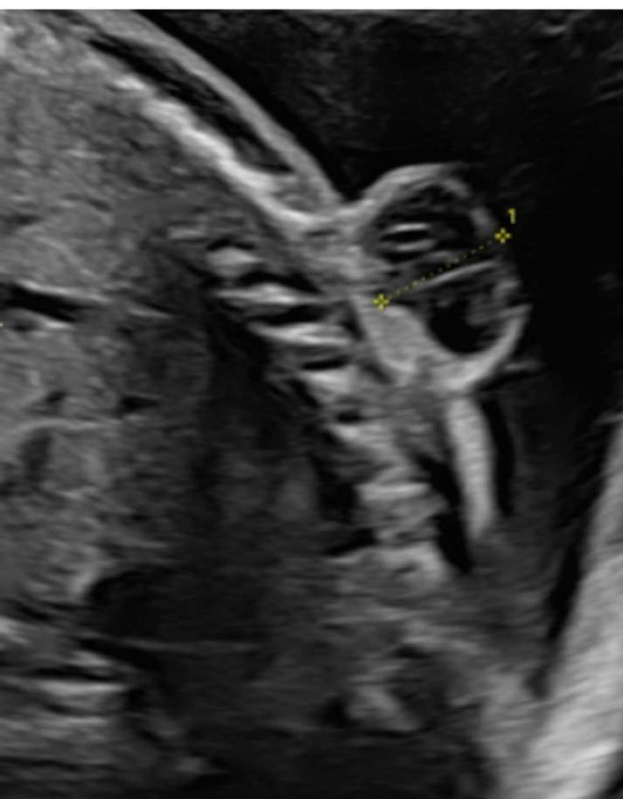
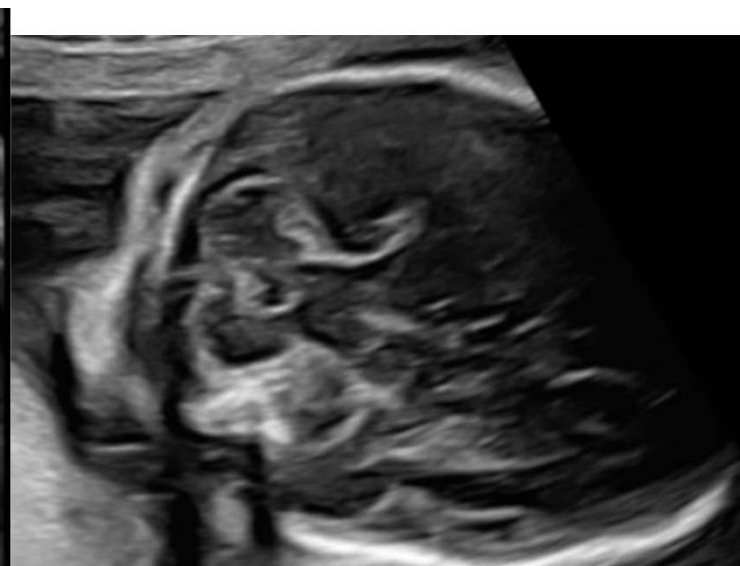
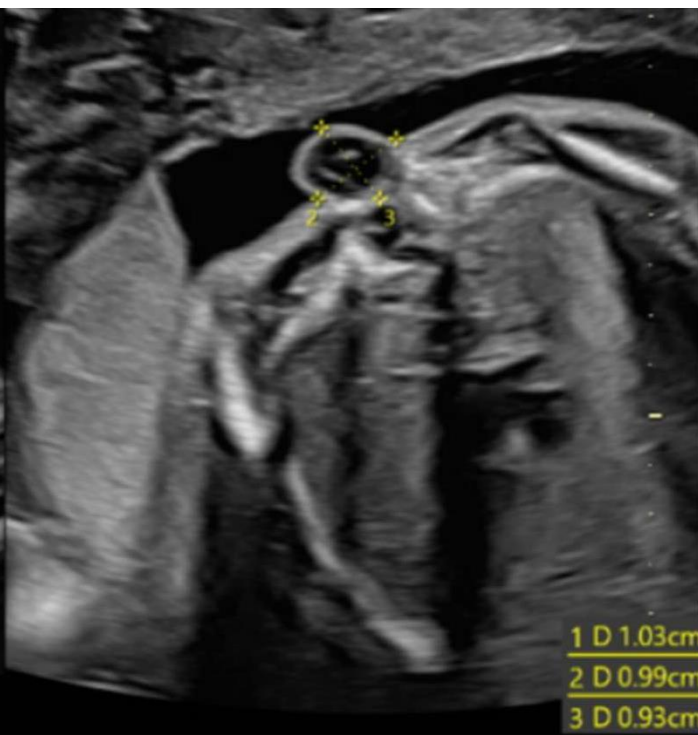
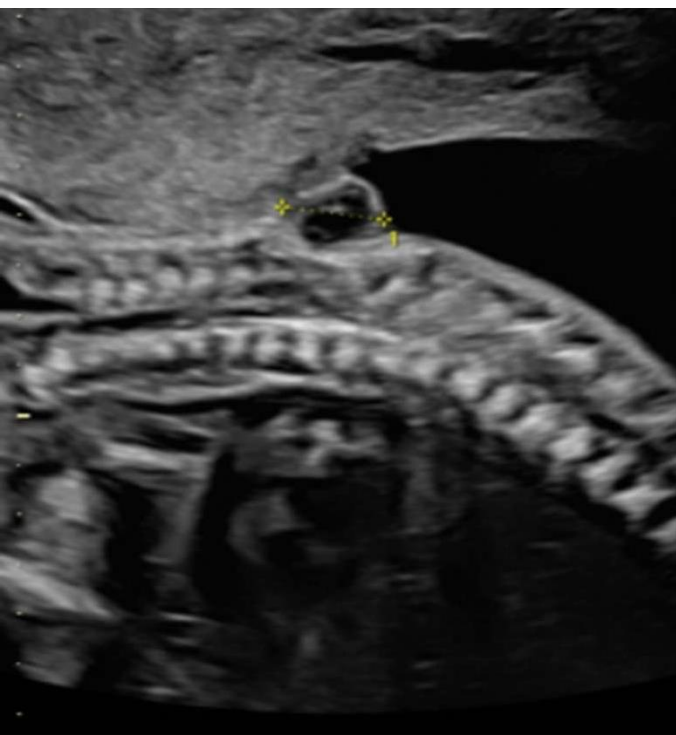
- Severe FGR – usually apparent early
- Abnormal CNS findings — ventriculomegaly, holoprosencephaly, microcephaly
- Cardiac defects
- Limb abnormalities, including abnormal hands/feet
- Abdominal wall and renal abnormalities
- Oligohydramnios or polyhydramnios, depending on the phenotype
- Thickened/abnormal placenta

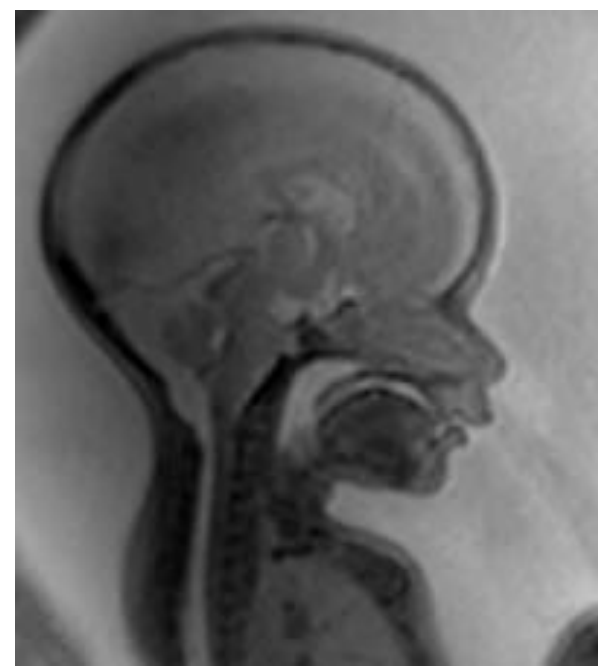
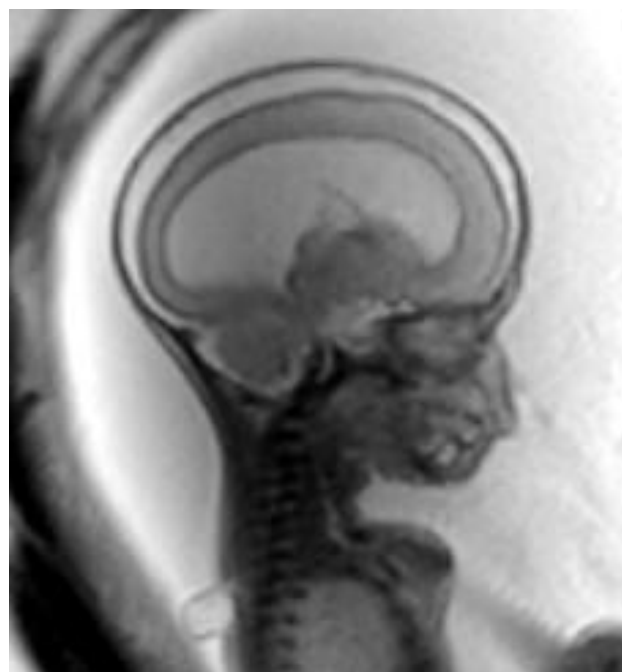
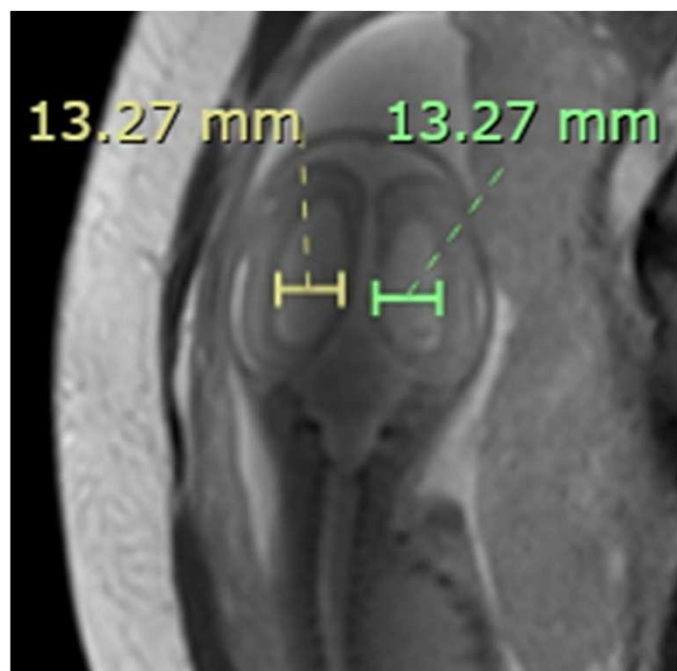
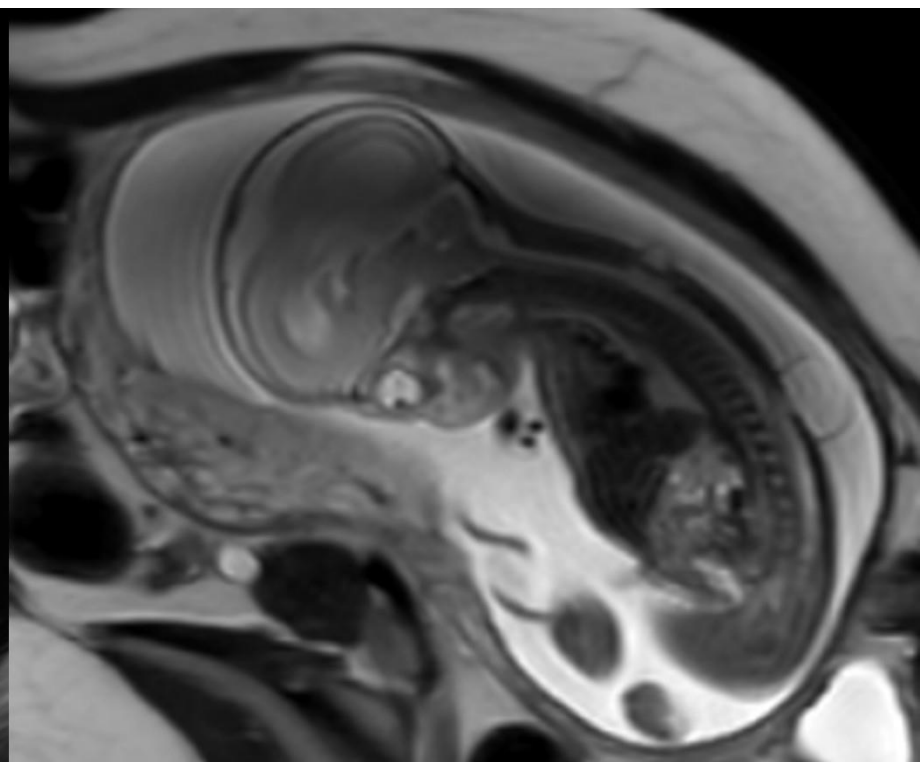
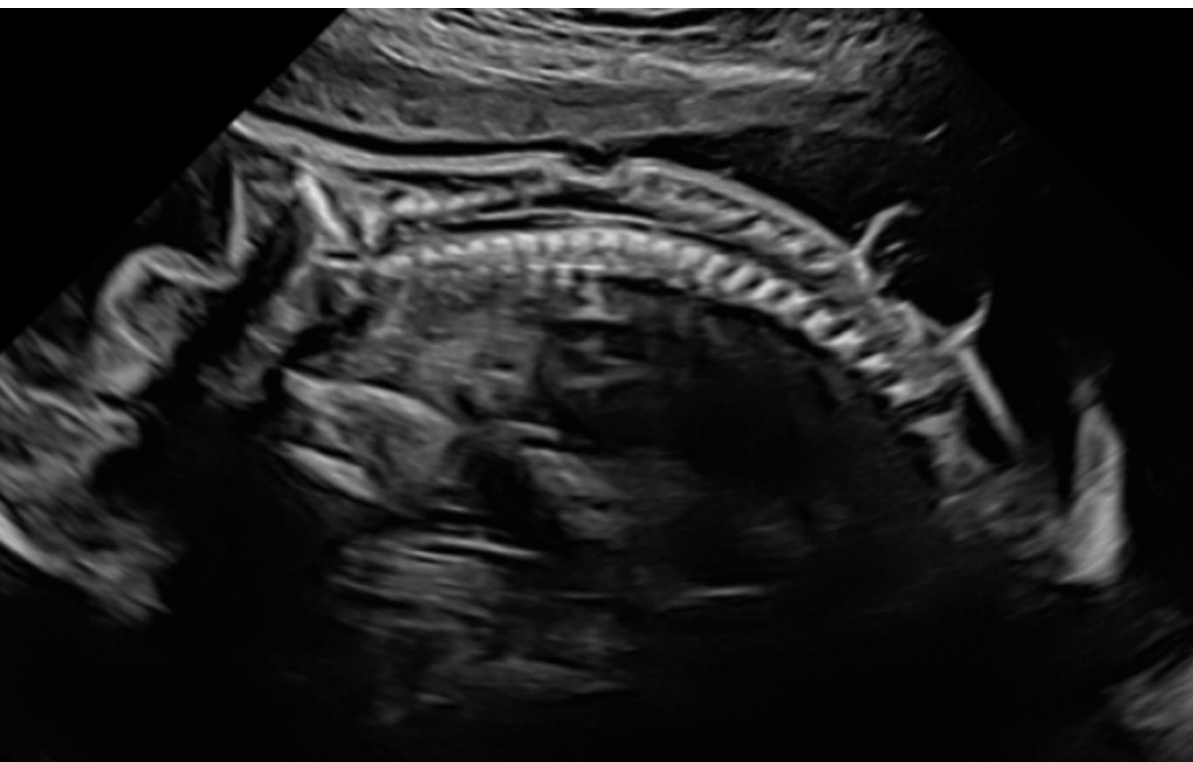
Placental pattern can particularly helpful

- Diandric triploidy (extra paternal set) tends to produce a large, cystic, molar-appearing placenta and is often associated with markedly increased β -hCG. This can resemble a partial hydatidiform mole.
- Digynic triploidy (extra maternal set) more often produces a small, nonmolar placenta with severe fetal growth restriction

Case 7

- 19 yrs old G6 P1041 at 23w 0d transported to CFCC over a weekend due to threatened preterm labor with known diagnosis of spina bifida made the prior week.
- MFM US w/ AGA fetus with MMC findings:
 - Skull with parietal scalloping (lemon sign)
 - Small cerebellum; no significant herniation.
 - Lateral ventricles: 14 (Rt) and 13 (Lt) mm.
 - Spine w/ 2 cystic structures representing neural tube defects: **T1-4** (2.3 x 2 x 1.6 cm) & **T10-L2** (0.7x1.0x1.0 cm).
 - Feet; No evidence of clubbing; normal movement.
 - Probable muscular VSD.
- Amnio – normal CMA and WES





Criteria for MMC Repair In-Utero

(Guideline Updated 9-1-2026)

2011 MOMS Trial Criteria	2026 Updated Fetal MMC Closure
INCLUSION	INCLUSION
MMC T1 to S5 by US	No change
MRI confirmed Grade II hindbrain herniation	No change
BMI<40	<40 (if >40 will evaluate as not all obesity is central)
Maternal age 18 to 45yo	>18 (<18yo; family support and social work approval)
GA 19 0/7 to 25 6/7	No change
Normal karyotype or at least FISH	• Minimum: normal FISH <u>with o/w</u> normal US • If additional (non-NTD) US findings: require normal CMA or WES • Autosomal aneuploidy: NO • Sex chromosomal aneuploidy and atypical findings on CMA (case by case; e.g. Turner Syn; Charcot Marie Tooth); consider based on risk of preterm delivery (spontaneous or indicated) or risk of death
Normal fetal echo	Normal fetal echo; small/isolated VSDs acceptable
Singleton pregnancy	No change
Willing to remain in Denver area for 2 weeks	No change (special circumstances may apply)

2011 MOMS Trial Criteria	2026 Updated Fetal MMC Closure
INCLUSION	INCLUSION
Morbid obesity; BMI>40	As above
Significant fetal anomaly unrelated to MMC	No change **
Kyphosis in fetus >30 degrees	Kyphosis in fetus of >45 degrees
History of cervical insufficiency or CL <2.0cm or presence of cerclage	No change
Maternal-fetal Rh isoimmunization, Kell sensitization or a h/o NAIT	No Change
Maternal HIV, Hep B, Hep C due to increased transmission rate to fetus with MMC repair	No change
Uterine anomaly such as large or multiple uterine fibroids or mullerian duct abnormality	No change; arcuate uterus with prior term delivery acceptable
Maternal medical condition which is contraindication to abdominal surgery or general anesthesia	No change
IDDM	No change
Obstructive sleep apnea (corrected or uncorrected)	No change
Maternal HTN (uncontrolled HTN, CHTN with end organ ~~dysfxn~~ , new onset HTN in current pregnancy)	No change
Placenta previa or abruption	No change
Placenta previa or abruption	No change
Prior PTB <37 weeks	Prior PTB <36 weeks
Prior active segment hysterotomy, mullerian anomaly ~~sx~~ or myomectomy	Individualize • Prior mullerian anomaly surgery; NO • Consider indication for active segment hysterotomy (e.g. severe ~~preE~~ or PTL compared to term LTCS active segment extension) • Myomectomy; Individualize
No support person to stay locally	No change
Psychosocial criteria not met per SW	No change

** Good prognosis anomalies ok (CPAM, unilateral renal agenesis, etc).
No anomalies that increase risk of PTB or other procedures (pleural effusions, anomalies, etc) or that jeopardize neonatal life.