



OC 05.01

To coarct or not to coarct:
does the third trimester 'golf club sign'
help in differentiating
a true from a false coarctation?

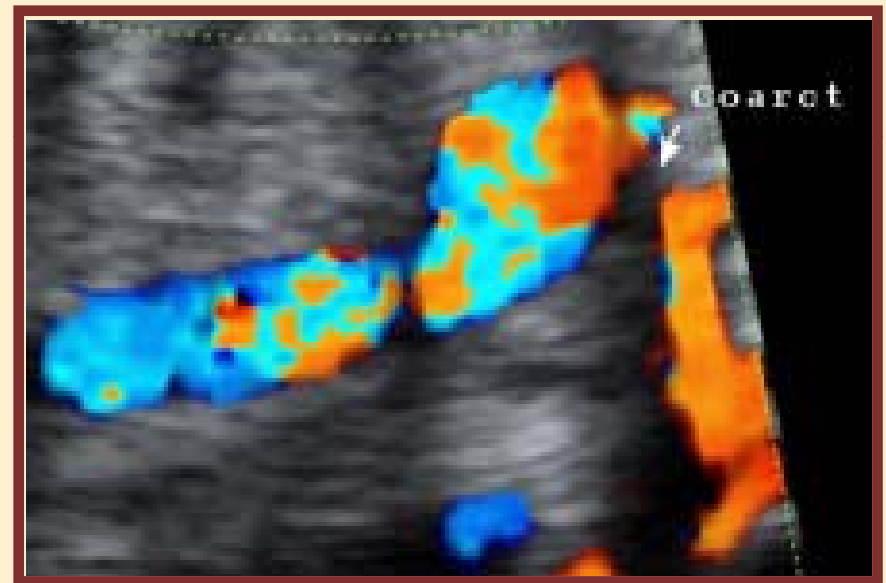


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Background

- CoA is a prenatal diagnostic challenge
- Constitutes ~5% of congenital heart disease in newborns Abuhamad, Chaoui 2010
- Can only be confirmed postnatally Allan, Cook, Huggon 2009

Current Sonographic Markers

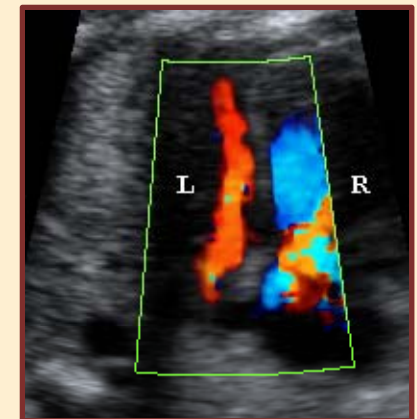
- Ventricular disproportion
- $PA/Ao \geq 1.6$ Slodki JUM 2009
- Isthmic hypoplasia, contraductal shelf
- Y connection Bronshtein UOG 1998
- Foramen ovale (L→R)
- Bicuspid AV, left SVC
- Ao/RV (Paladini ISUOG 2011 OC.05.02)

Limitations of Current Sonographic Markers

- Ventricular disproportion may lead to 80% FPR
- Y Sign was described at 14-16 weeks Stos Archive de Maladies du Couer et des Vaisseaux 2007
- Impossible to ascertain sensitivity
- FPR major contributor to parental anxiety



Ventricular Disproportion



Ventricular Disproportion



LVOT (L), PA (R)

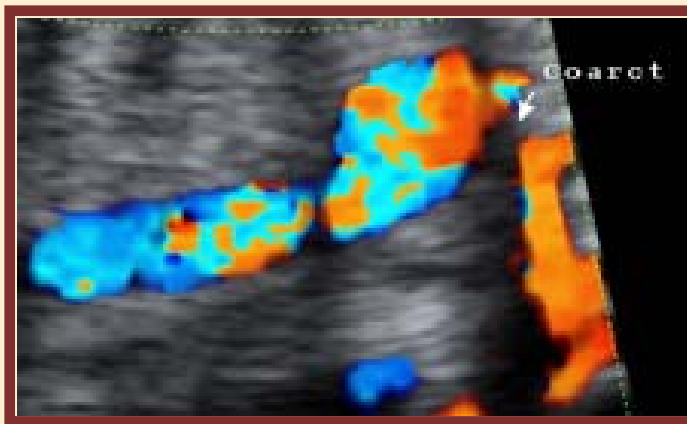


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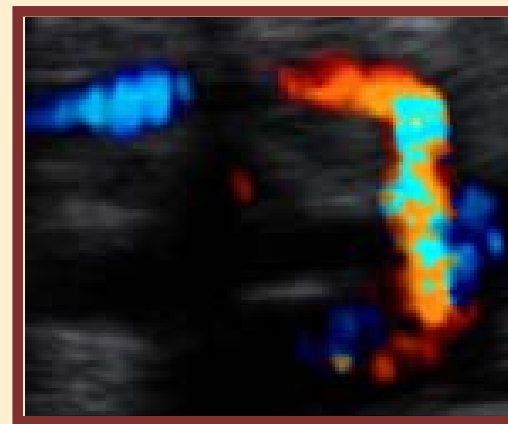
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Objective

- The aim of our study is to evaluate the role of a third trimester sonographic finding, the 'golf club sign' (GCS), in differentiating a true from a false coarctation (CoA)
- In coarctation, there is decrease in left sided blood flow and a compensatory increase in the right side. This may be reflected in a larger ductus arteriosus, taking the shape of a 'golf club'



'Golf Club ' Formed by a Dilated Ductal Arch in CoA



'Hockey-Stick' of a Normal Ductal Arch

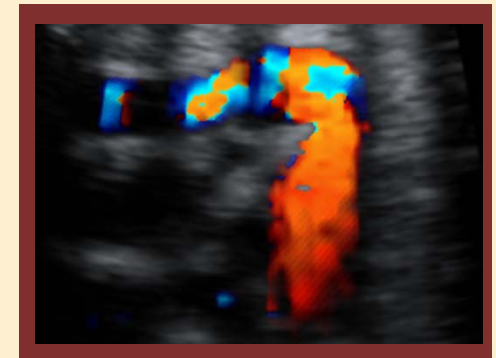


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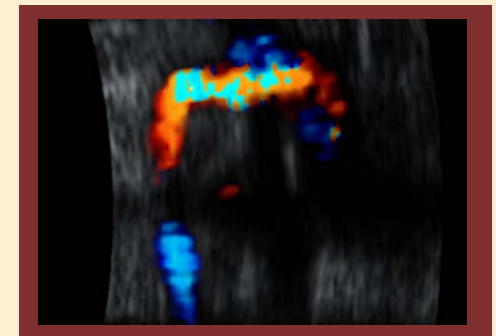
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Methods

- Prospective study on 243 gravidas, mean GA 32w2d
- All were scanned in the first, second and third trimester
- Examined: 4 chamber view, outflow tracts, 3 vessel view
- With ventricular disproportion, the PA/Ao was measured
- Sagittal views: great arteries checking for shelf, GCS
- Single sonologist certified by the FMF
- Suspicious cases were referred to pediatric cardiology
- Suspicious cases were delivered at a tertiary care center
- Outcome was available on all neonates



'Golf Club Sign ' Formed by
a Dilated Ductal Arch in CoA



Normal 'Hockey-Stick'
Appearance of the Ductal Arch



OC 05.01

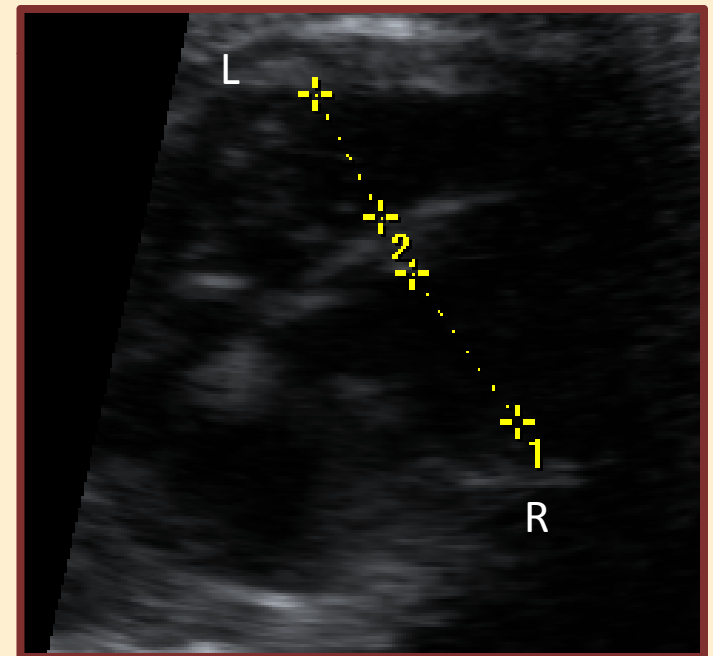
To coarct or not to coarct:
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Results

- 240/243 normal scans
- 3 cases with ventricular disproportion
- 1 case with ventricular disproportion **without** a GCS
- 2/3 cases with ventricular disproportion **with** GCS
- All 3 delivered at a tertiary care center
- Only 1 case with a true coarctation requiring surgery

	CoA	No CoA
GCS +	1	1
GCS -	--	241

Sensitivity 100% Specificity 99%
PPV 50% NPV 100%



Ventricular Disproportion in a False Coarctation



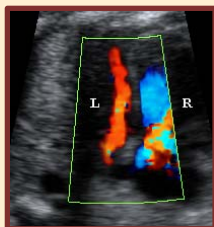
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Results

Case	NT	FTS	STS	TTS	VD	Ao/PA <0.8	PA/Ao >1.6	Shelf	GCS	Other	Outcome
1	1.8	13w2d	22w5d	34w1d	+	5.8/10.2 0.57	10.2/5.8 1.76	+	+	VSD	Coarct
2	1.6	13w3d	22w4d	36w2d	+	5.3/7.5 0.71	7.5/5.3 1.42	+	-	-	Normal
3	2.3	12w6d	21w2d	34w0d	+	4.7/6.8 0.69	6.8/4.7 1.45	+	+	Extra Systole	Situs Inversus

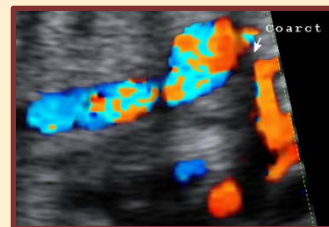
NT: nuchal translucency. FTS, STS, TTS: first, second, third trimester scans. VD: ventricular disproportion. Ao: aorta, PA: pulmonary artery. GCS: golf club sign.



Case 1: VD



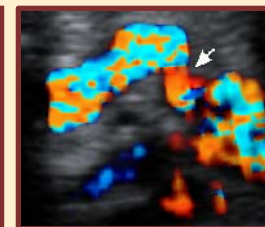
Case 1: 3VV



Case 1: GCS, Shelf



Case 1: GCS, Shelf



Case 2: No GCS, Shelf



Case 3: GCS, Shelf



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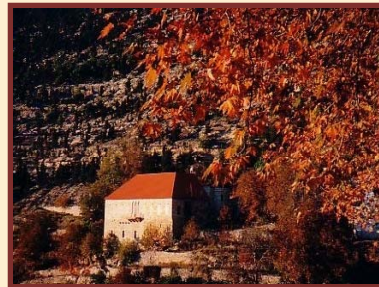
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Limitations

- Sample size
- Single sonologist
- Need larger studies to validate

Conclusion

- CoA remains a challenging in utero diagnosis
- Highly sensitive and specific sonographic markers are instrumental
- In this very small cohort, the GCS was 100% sensitive 99% specific and had a PPV 50%
- Its negative predictive value of 100% may help ease parental anxiety
- Future scoring system of all the markers?



Thank you from Lebanon...



OP01.11

Can the fetal NT help predict the evolution of hypoplastic left heart syndrome suspected at 11-14 weeks?

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Objective

To assess the evolution of hypoplastic left heart syndrome (HLHS) suspected at 11-14 weeks, and to evaluate the impact of the NT on predicting outcome.

Methods

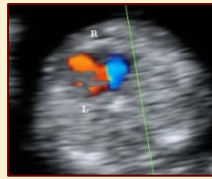
Retrospective study comparing the findings and natural progression of 5 cases of HLHS suspected at 11-14 weeks. All scans were performed by a single sonologist certified by the Fetal Medicine Foundation. Fetuses suspected of having HLHS were referred to pediatric cardiology. The 5 cases were compared with respect to NT, presence of other structural/cardiac findings, karyotype (when available), final diagnosis and outcome. Chi square test was used in the analysis. $P < 0.05$ was considered statistically significant.

Results

There were 5 fetuses confirmed of having HLHS. Of those 2 (40%) elected termination at 15w0d and 21w6d, and 2 (40%) had spontaneous in utero demise at 14w2d and 18w0d. All 4 had an NT > 3 mm. The 5th case had a normal NT of 2.2 mm and evaluation at 2 week intervals demonstrated a decrease in the atrio-ventricular disproportion (AVD),



NT at 13w0d



4CV at 13w0d



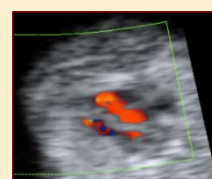
4CV at 17w0d



2D Cine at 21w3d



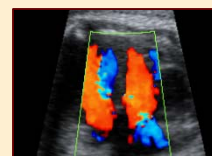
4CV at 13w0d



4CV at 15w0d



LSVC at 21w3d



4CV at 32w3d

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a persistent left superior vena cava (LSVC) and a suspected dilated coronary sinus versus an atrioventricular (AV) canal.

The fetus was delivered at term and the final diagnosis was an AV canal, persisting LSVC and a dysplastic mitral valve. The NT was highly predictive of the outcome in the 5 cases: the higher the NT the higher the chance for in utero demise. In the one case with a normal NT (20%), there was normalization of the AVD and a favorable neonatal outcome. Even though our sample size was very small, having an NT < 3 mm was associated with a favorable outcome ($P=0.025$).

Conclusion

In this small cohort of patients, our study emphasizes the varied outcome of HLHS suspected at 11-14 weeks with 40% ending with spontaneous in utero demise and 20% having a favorable outcome. As has been previously shown, the larger the NT, the worse the fetal prognosis and the higher the chances of spontaneous demise. This may lessen the burden on those families electing to terminate. Whenever HLHS is encountered with a normal NT, caution must be exercised without haste in offering termination.

	Age	G	P	GA	NT	NB	4CV	TR	Karyotype	Other Findings	Final Diagnosis	Outcome
1	19	4	1021	14w2d	3.1	+	HLH	abn	n/a	Megacystis, limb amputation	Multiple anomalies with HLHS	TOP at 15w0d
2	34	5	3103	13w1d	4.2	+	HLH	nl	n/a	-	HLHS	TOP at 21w6d
3	37	4	3003	12w6d	7.9	+	HLH	abn	n/a	-	HLHS	FDIU at 14w2d
4	22	2	1001	13w3d	8	+	HLH	nl	45XO	Cystic Hygroma	Turner Syndrome with HLHS	FDIU at 18w0d
5	18	1	0	13w0d	2.2	+	HLH	nl	n/a	NI at 21w3d and 24 LSVC	AV Canal, Dysplastic MV, LSVC	Alive at 6 months



OP04.03

Is the size of the fetal renal pelvis gender-dependent at 20-24 weeks?

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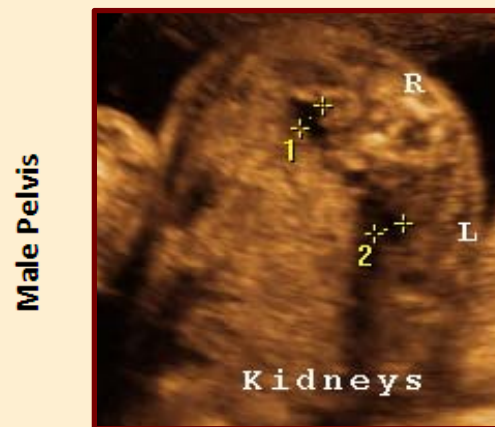
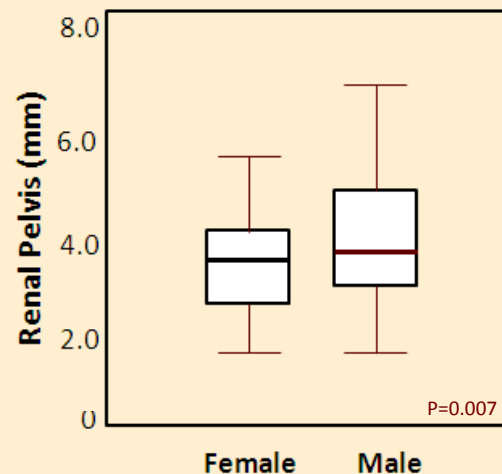


Objective

Clinically we have noted that male fetuses tend to have a more prominent renal pelvis than female fetuses at 20-24 weeks. For this reason, this study was conducted with the aim of comparing the antero-posterior diameter of the renal pelvis in male fetuses versus female fetuses at 20-24 weeks of gestation given the role of pyelectasis as a second trimester marker for trisomy 21.

Methods

Prospective study on 203 euploid fetuses who had confirmed dating and who underwent first trimester scanning between 11 and 14 weeks. A second trimester scan was done at 20-24 weeks. When prominent, the antero-posterior diameter of both renal pelvises was measured in all fetuses in an axial plane. All scans were performed by a single sonologist certified by the Fetal Medicine Foundation. All fetuses had a known outcome and were healthy term live births. We excluded twin gestations, anomalous fetuses, fetuses born at less than 37 weeks, and those who were lost to follow up beyond the first trimester scan.



T-test and chi square were used for the statistical analysis. $P < 0.05$ was considered statistically significant.

Results

Using the paired test in comparing the right to left pelvises in all fetuses, no statistical difference was found. As a result, the average of each fetus' renal pelvises was used in the analysis. There was a statistically significant difference between the mean female pelvis of 3.41 mm and the mean male pelvis of 3.84 mm ($p=0.007$). Looking at fetuses with an average renal pelvis of ≥ 6 mm, there was a statistically significant difference between the males and females. In 8% of males and 1.3% of females, the renal pelvis measured ≥ 6 mm ($p=0.04$).

Conclusion

In a representative sample of our population under study, the renal pelvis in the euploid male fetus is larger than that in the euploid female fetus. As a result, it may be worthwhile to establish gender specific normograms and gender specific cutoffs for pyelectasis when incorporating it into the second trimester risk assessment of trisomy 21.



OP35.08

How good are we in prenatal diagnosis of congenital heart disease in Lebanon?

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Objective

To determine the prenatal diagnosis rate (PDR) of congenital heart disease (CHD) in a pediatric population age ≤ 5 years.

Methods

Prospective study at 3 pediatric cardiology clinics on 74 consecutive patients at age ≤ 5 years. Patients were questioned about family history (FHx), if they were scanned prenatally and if an abnormality was suspected prenatally. The presence of other structural/chromosomal abnormalities, age at diagnosis, final diagnosis and the need for surgical/medical intervention was established. Data was analyzed using chi square and non-parametric z approximation. Scans were performed by a single pediatric cardiologist. No information was available on patients who may have been prenatally diagnosed, terminated or had spontaneous in utero demise. $P < 0.05$ was considered statistically significant.

Results

A total of 74 patients with 94 lesions were enrolled. FHx was positive in 18.9%. All were scanned prenatally and 86.5% were scanned at each prenatal visit. The PDR was 21.2%. Mean age at diagnosis was 13.4 months. The most prevalent lesions in our population were ventricular septal defect 32.4%, pulmonary artery stenosis 12.2%, patent foramen ovale 9.5%, tetralogy of fallot 8.1% and dysplastic mitral valve 6.8%. Of all cases, 39.2% already had or would require surgical intervention and 21.2% needed medical therapy. Of 6 with a known karyotype, 4 had trisomy 21, 1 had DiGeorge syndrome and 1 was normal. Of the 94 total lesions, 56.4% were amenable to prenatal diagnosis by a 4 chamber view but only 18.9% were diagnosed prenatally. Prenatal diagnosis was considered critical (cyanotic lesions) in 26/94 and of those, 7/26 (26.9%) were diagnosed prenatally versus in 7/68 (10.3%) of those with non-critical lesions ($p=0.043$).

Conclusion

Even though 100 % of patients were scanned prenatally, the PDR for CHD was only 21.2% and 18.9% for lesions diagnosable by a chamber view, and 26.9% in those in whom prenatal diagnosis is critical. This calls for the urgent implementation of proper basic training in fetal echocardiography in order to maximize the utility of our sonographic machines and enhance our prenatal diagnosis rates.

Most Common Lesions Total (% Out of 74)

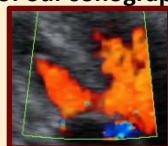
Ventricular Septal Defect	24 (32.4%)
Pulmonary Artery Stenosis	9 (12.2%)
Patent Foramen Ovale	7 (9.5%)
Tetralogy of Fallot	6 (8.1%)
Dysplastic Mitral Valve	5 (6.8%)

Lesions Diagnosable by 4 Chamber View Total Number Prenatally Diagnosed

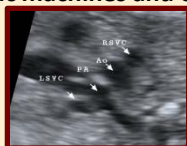
Ventricular Septal Defect	24	2 (8.3%)
Tetralogy of Fallot	6	1 (16%)
Dysplastic Mitral Valve	5	0
Atrioventricular Septal Defect	4	2 (50%)
Tricuspid Atresia	3	0
Pulmonary Atresia	3	1 (33%)
Dysplastic Tricuspid Valve	2	1 (50%)
Dextrocardia	1	1 (100%)
Total Anomalous PVR	1	0
Isomerism	1	0
Hypoplastic Right Heart	1	1 (100%)
Single Ventricle	1	0
Situs Inversus	1	1(100%)
Diagnosable by 4CV	53/94 (56.4%)	10/53 (18.9%)



Coarctation



VSD



Left SVC



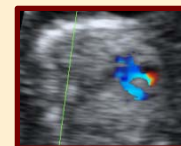
Univentricle



DORV



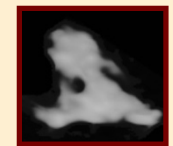
Tricuspid Atresia



AV Canal



Azygous Continuation



Hypoplastic R



P06.14

Normogram for the frontomaxillary facial angle in a Lebanese population

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Objective

The frontomaxillary facial angle (FMFA) is a first trimester (FT) marker for trisomy. Recently, its role as a FT marker for spina bifida (SB) has been evaluated. Our objective was to determine the normogram for the FMFA in an unselected low risk Lebanese population and to compare our results to the established normogram of Borenstein et al to assess for any ethnic variations precluding its application in our population as an early FT marker of trisomy and SB.

Methods

Prospective study on 361 fetuses with confirmed dating undergoing a FT scan at 11 to 14 weeks. All scans were performed by a single sonologist certified by the Fetal Medicine Foundation. The FMFA was measured in all fetuses in a mid sagittal plane according to the guidelines of the Fetal Medicine Foundation. Regression analysis was used to establish the relationship between fetal crown rump length (CRL) and FMFA. ANOVA test of means was employed to compare the mean FMFA in relation to the CRL. $P < 0.05$ was considered statistically significant. All fetuses were healthy term live births.



Results

A total of 361 patients were included in the analysis. Mean CRL was 72.48 mm. Mean FMFA was 77.29°. Regression analysis was employed to establish the relationship of FMFA to CRL and it revealed no significant decrease in the FMFA with advancing gestation ($P=0.609$) as has previously been described by Borenstein et al. Statistical analysis using ANOVA test of means comparing the mean FMFA with CRL indicated that the mean FMFA is significantly unchanged as CRL increases or decreases. For a CRL of 50-59, 60-69, 70-79 and 80-89 mm, the mean FMFA was 79.3°, 77°, 77°, 78.1° and 77.3° respectively ($p=0.421$). The FMFA was $> 85^\circ$ in 7.8% of our patients.

CRL mm	Total Cases	FMF			patients (%) with FMFA $> 85^\circ$
		Mean \pm SD	Min	Max	
[50-59]	20	79.3 \pm 1.1427	68.00	89.00	1 (5.0%)
[60-69]	93	77.0 \pm .6989	57.00	94.00	5 (5.4%)
[70-79]	203	77.0 \pm .4946	54.00	97.00	16 (7.9%)
[80-89]	45	78.1 \pm 1.0247	64.00	89.00	6 (13.3%)
Total	361	77.3 \pm .3608	54.00	97.00	28 (7.8%)

Conclusion

Our study demonstrates that in an unselected low risk Lebanese population, there is no statistically significant decrease in the FMFA with advancing gestation as has been previously reported by Borenstein et al. In 7.8% of our population, the FMFA is $> 85^\circ$. This ethnic variation calls for employing caution when using the FMFA in our FT screening for trisomy and when screening fetuses who may be at risk for SB.



P07.02

First trimester diagnosis of congenital diaphragmatic hernia: too good or too bad?

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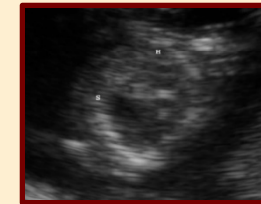


Case Presentation

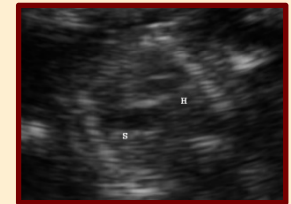
Congenital diaphragmatic hernia (CDH) is a rare condition with an incidence of 1/2200, the majority of which (85%) are left sided. First trimester (FT) diagnosis is possible and has been reported as early as 12 weeks. At the time of the FT scan, an accurate diagnosis is possible in 1/6 of patients with CDH (Sepulveda 2008). An increased nuchal translucency (NT) is present in 40% of cases (Sebire 1997).

A 39 year old, Para 4, BMI 30.9, with no past history, presented for a routine first trimester scan at 12w5d. At our center, a full anatomical survey is performed at the time of the NT assessment. Transabdominal ultrasound confirmed the menstrual dates with a crown rump length of 68.5 mm. The butterfly sign was seen and the spine seemed intact. Fetal kidneys, bladder, extremities and cord insertion were all normal. What was striking was the fetal chest. Evaluating the fetal heart revealed dextroposition with 4 symmetrical chambers. A cystic structure, the fetal stomach, was seen occupying the center of the chest. The left-sided CDH was confirmed transvaginally. The family elected to wait and a reassessment was carried out at 14w1d. At this point, the dextroposition persisted, with normal outflow tract cross over and a normal 3 vessel view. A clear centrally located intrathoracic stomach was seen. Furthermore, echogenic bowel was occupying the entire left chest. There was a cystic structure seen in the left lower pelvis adjacent to the bladder which could not be identified. The parents declined karyotype and opted for termination of pregnancy (TOP). Post-mortem examination was also declined.

In conclusion, diagnosis of CDH is feasible in the first trimester of pregnancy. In our case, cardiac dextroposition and the presence of an intrathoracic stomach were the key to the diagnosis. At present, there is no evidence that early diagnosis is associated with a more severe CDH and prognostication is validated only after 22 weeks of gestation. Unfortunately, the down-side of early diagnosis is the increased risk of TOP before reaching the period when a prognosis can be given, especially in countries where the legal limit for TOP is at the end of the first or early in the second trimester trimester of pregnancy.



Heart (H) & stomach (S)
at 12w5d



Heart (H) & stomach (S)
at 14w1d



Dextroposition
at 14w1d



Cystic structure in the left
pelvis at 14w1d



Intrathoracic bowel
at 14w1d



Outflow tract cross over
at 14w1d



Sagittal view of the hernia
at 14w1d



Heart (H) & stomach (S)
at 14w1d



P07.04 Rhizomelia at 12w6d: a case report

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Case Presentation

Skeletal dysplasias remain a challenging prenatal diagnosis with over 150 different types identified. An increased NT has been reported (Tonni et al) though sonographic diagnosis in the first trimester (FT) remains elusive since the severity of findings is influenced by advancing gestation.

A 37 year old, Para 1, BMI 29.1, IVF pregnancy, with a negative medical and family history, presented for a FT scan at 12w6d. CRL was 60.5 mm, NT was 1.56 mm, nasal bone was present and the facial angle was 72°. The butterfly sign was seen with an intracerebral translucency of 2.6 mm. The spine, kidneys, bladder and cord insertion were normal. The fetal heart had 4 symmetrical chambers, normal outflow tract cross over and no tricuspid regurgitation. Four extremities with 12 long bones were seen. Rhizomelia was present with a femur of 2.3 mm (< 3%). The findings were confirmed transvaginally. Given the limitations at this gestational age, the fetus was re-examined at 14w6d and 16w3d. There was no frontal bossing, no hypomineralization of the skull or ribs, and a suspected club foot. Both humeri and femurs were bowed and measured < 3%. The radii, ulnas, tibias, fibulas, head and abdominal circumferences were all normal. Micro-retrognathia and an echogenic intracardiac focus were noted at 16w3d. The family declined genetic counseling for targeted definitive molecular diagnosis and opted to proceed with termination of pregnancy at 16w4d. Post mortem, the findings were confirmed. However, there was a unilateral cleft lip and palate and a "hitchhiker" thumb that were missed prenatally. Autopsy was declined. The findings are highly suggestive of diastrophic dysplasia.

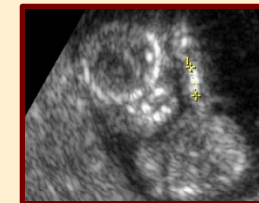
Our case demonstrates that the diagnosis of rhizomelia is feasible in the FT even with a negative family history and a normal NT. This further attests to the invaluable role of a full anatomical survey in the FT to aid in the early diagnosis of potentially lethal abnormalities, providing time for a thorough workup, preparing the family and complying with the various gestational age-based termination limitations in various parts of the world.



Fetal thigh
at 12w6d



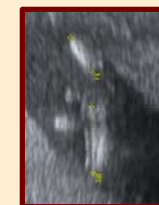
Lower extremity
at 12w6d



Humerus
at 12w6d



Surface rendering of the
fetus at 12w6d



Fetal leg
at 14w6d



Surface rendering of the
fetus at 16w3d



Rhizomelia and club foot
postmortem



Micrognathia, facial cleft
hitchhiker thumb



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Evaluation of ultrasound training in Lebanon's Ob/Gyn residency programs

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Objective

To evaluate ultrasound training in Ob/Gyn residency programs in Lebanon and determine whether there is a need for establishing and incorporating a standardized approach to ultrasound training.

Methods

Questionnaires were e-mailed to all 74 residents in the seven Ob/Gyn residency programs in Lebanon inquiring about the year in training, exposure to ultrasound in medical school and the type of sonographic training being offered. Residents were asked about the adequacy of training by rating their capabilities in evaluating 21 obstetrical and gynecological criteria using a 5 level Likert scale, and whether a more structured sonographic training is needed. The data was analyzed using descriptive statistical approach, t-test and ANOVA test of means. $P < 0.05$ was considered statistically significant.

Results

The response rate was 72% representing 47-100% of the total sampled residents in each of the programs. Only 6% of sampled residents felt that their training was adequate and 98% felt that they needed further training before graduating. The majority, 85%, were planning a fellowship. The areas of greatest confidence were in determining fetal viability (73%), pregnancy location (61.8%) and placental localization (53.8%). Around 1/4 of sampled residents (24.5%) had a technicality score (TS) above the average ($< 50\%$). The TS was not related to gender ($p=0.328$) and was similar comparing first with second-year residents and third with fourth-year residents. However, the TS was significantly higher comparing third and fourth-year residents with those in the first two years of training ($p=0.004$).

Conclusion

There is a lack of structured training in Ob/Gyn ultrasound in Lebanon's residency programs where only 6% of residents feel that they are receiving adequate training and 98% believe that they need more training prior to graduating. Nonetheless, the areas in which the residents feel that they have the most skill are those directly impacting maternal morbidity and mortality. This calls for incorporating a standardized approach to theoretical and practical obstetrical and gynecological training in ultrasound in Lebanon's Ob/Gyn residency programs.

