OB/GYN REFERENCE GUIDELINES 1st/Nuchal/2nd trimester
FIRST TRIMESTER ULTRASOUND

GROWTH RATE: embryo-1mm/d; sac-1.1mm/d. Correlate development with dates and B-hCG level

DISCRIMINATORS (conservative size at which a finding MUST be seen):
MSD > 10 mm must have a yolk sac
MSD > 18 mm must have an embryo
CRL > 5 mm must have a heart beat

THRESHOLD (size at which a finding MAY be seen):
Gestational sac 2 mm
Yolk Sac: 4 mm
Embryo: 8 mm
Heartbeat: 2 mm CRL

EMBRYONIC CARDIAC ACTIVITY – demonstration of cardiac motion indicates that the fetus is alive. Failure to visualize cardiac activity must be interpreted with caution. Cardiac activity is present in normal embryos before it can be detected on ultrasound. Studies by Goldstein and Levi, et al have shown that in normal embryos with CRL of 3 mm or less no cardiac activity may be visualized on ultrasound and follow up is suggested. When the CRL reaches 5 mm or more fetal heart motion should be identifiable. Therefore, transvaginal ultrasound CRL >5mm with no cardiac activity is consistent with embryonic demise.

ABNORMAL GESTATIONAL SAC FEATURES: A large diameter of the sac [dimensions vary depending on whether transabdominal or endovaginal scan is performed], without a demonstrable embryo or yolk sac [i.e. sac size suggests that fetus is of gestational age where embryo and yolk sac should be visualized]. Irregular or distorted shape of gestational sac. Low position of the sac in the endometrial canal. Thin decidual reaction [< 2 mm]. Absent double-decidual reaction.

ANEMBYRONIC GESTATION (BLIGHTED OVUM) CRITERIA: No fetal pole identified on transvaginal scanning AND the gestational sac mean sac diameter ≥ 25mm (RSOG criteria) OR there is little to no growth of the gestational sac on interval scans (normally expect increase in mean sac diameter of 1mm per day). If the mean sac diameter is too small to determine the status of the fetus on the initial ultrasound, a follow-up scan in 10-14 days should differentiate early pregnancy from failed pregnancy. Ancillary features of anembryonic gestation include absent yolk sac when MSD ≥ 8mm, poor decidual reaction <2mm, irregular sac shape, abnormally low sac position. Therefore, diagnosis of anembryonic gestation (blighted ovum) is certain when the transvaginal MSD ≥ 8mm (other institutions use MSD 10mm discriminatory value) without a yolk sac OR when transvaginal MSD ≥18mm (other institutions may use ≥16mm) without an embryo.

B-hCG LABS: Failure to detect an intrauterine gestational sac by transvaginal ultrasound when beta-hCG value exceeds discriminatory level (1000 to 2000 mIU/mL) indicates an increased risk for ectopic pregnancy.

SONOGRAPHIC FEATURES OF EARLY PREGNANCY FAILURE: Certain sonographic features predict early pregnancy failure including fetal bradycardia (heart rate less than 85 beats per minute, some consider less than 100 beats per minute lower limit) at greater than 7 weeks gestational age, small sac relative to the embryo (difference of less than 5mm between mean gestational sac size (MSD) and crown/rump length (CRL) termed first trimester oligohydramnios or small gestational sac), enlarged (>6mm) or abnormally shaped (crenelated) yolk sac, subchorionic hematoma.

Reference:
Gestational sac: http://www.fetalultrasound.com/online/text/12-051.HTM
First trimester ultrasound: http://sogc.org/wp-content/uploads/2013/01/161E-CPG-June2005.pdf

HIGH RISK OBSTETRIC ULTRASOUND GUIDELINES

UCSD FETAL ECHOCARDIOGRAPHY INDICATIONS – 7/00
FETAL FACTORS:
Aneuploidy
Abnormal 4C/outflow tracts
Pericardial effusion (>3mm)
Arrhythmia
Frequent premature beats (<10/minute)
Sustained bradycardia <120 bpm (>5min)
Sustained tachychardia
Extracardiac structural anomalies
Omphalocele
Right sided stomach or heart
Esophageal atresia
Diaphragmatic hernia
Radical limb defects
VACTERL anomalies
Conjoined twins
Unexplained hydrops
MATERNAL FACTORS:
Teratogens
Anticonvulsants
Lithium
Coumadin
Alcohol (severe exposure)
Indomethacin (more than 72 hours exposure)
Isotretinoin (systemic not cutaneous)
Maternal CHD
Rubella
FAMILIAL FACTORS:
Paternal CHD
Previous child with CHD
Genetic syndrome in parent/sibling (e.g. Marfan, Tuberous Sclerosis, DiGeorge)
Multiple secondary family members with CHD
GENERAL POLICY
ALL fetuses with anomalies must have documented 4CV and outflow tracts. If these are abnormal, these fetuses should then be referred in for a formal fetal echochardiogram. Outflow tracts are especially important in cases of: diabetes, monoamniotic twins, cleft lip/palate, clubfeet, any associated anomaly, secondary members with complex CHD, secondary members with left outflow lesions.

HIGH RISK OBSTETRIC ULTRASOUND DICTATION GUIDELINES

NEURO

CHOROIDAL SEPARATION
Choroidal separation in the region of the atrium greater than or equal to 4mm, recommend follow up in 6 weeks to re-evaluate, making sure to note which ventricle is abnormal and attempting to see both ventricles. Follow protocol for history of hydrocephalus. Follow-ups are usually around 22 weeks, then 28-32. If it persists at 32 weeks, recommend postnatal cranial ultrasound. Patients are also offered amniocentesis per data from the original Hertzberg study indicating a low incidence of karyotype abnormalities. Limbs should be checked to see flexion and extension.

DICTATE:
“Choroidal separation of __ mm is noted in the __ ventricle which is of unclear significance. Recommend follow up in ___ weeks.”
If <20 weeks, follow up in 2-4 weeks.
If >20 weeks, follow up in 6 weeks.
MILD VENTRICULOMEGALY >10mm at atrium of lateral ventricles (3rd ventricle dilated if >3mm diameter situated between thalami)
We currently recommend amnio for the increased risk of abnormal karyotype.
DICTATE:
“Recommend follow up to assess for progression and to see if there are any other abnormalities.”
<21 weeks, F/U in 2-3 weeks.
>21 weeks, F/U in 6-7 weeks.

CHOROID PLEXUS CYSTS
Talk to the genetic counselor regarding whether the patient should be told. When amniocentesis is performed, the patient may not be told (especially if it is the only abnormality). We may wait for the amnio results instead. The patient should get a rule out Trisomy 18 scan (open hands, normal ankles (evaluate for clubfoot), lip, palate and outflow tracts).
DICTATE:
“Choroid plexus cysts have a low association with karyotype abnormality.”

NUCHAL LUCENCY/NUCHAL THICKENING (region from surface of skin to the surface of the skull measured)
First trimester (11 to 13 weeks) ≥ 2.5 mm with fetus occupying 75% of the image.
Second trimester (16 to 22 weeks) ≥ 6 mm. Associated with trisomy 21.
DICTATE:
“Recommend referral to perinatology for high-risk assessment and ultrasound.”

CARDIAC

INTRACARDIAC ECHOGENIC FOCUS
Data suggests a low association with karyotype abnormalities. You will need to discuss these on an individual basis with the attending staff. EFLV is seen in 15% of Asians so it is less important in this ethnic group. “As an isolated finding in a low risk patient, an echogenic intracardiac focus is considered a normal variant finding. Correlation with maternal risk factors and serum lab markers is advised.”

SUBOPTIMAL OR NON-VIS OUTFLOW TRACTS
Typically not the solitary reason for a call back assessment.

HEART RATE:
Fetal tachycardia: sustained greater than 160-180 bpm (higher rates can occur with tachyarrhythmias)
Fetal bradycardia: sustained less than 120 bpm

Reference:
Cardiac malformations and arrhythymias:
https://www.elsevierhealth.com/media/us/samplechapters/9781416042242/Chapter%2019.pdf

RENAL

SECOND TRIMESTER PYELECTASIS:

3-4 mm – get transverse and longitudinal renal images to assess for caliectasis
Follow up at 32-34 weeks if caliectasis present
≥4mm
Get transverse and longitudinal renal images to assess for caliectasis.
DICTATE:
“Pyelectasis and/or caliectasis, recommended follow up ultrasound to be performed at 32-34 weeks to assess amniotic fluid and possible progression.”
THIRD TRIMESTER PYELECTASIS, 32 weeks and beyond pyelectasis:
≥ 6 mm but <10 mm
DICTATE:
“Follow up neonatal renal ultrasound should be performed after birth.”
≥ 10mm needs pediatric urology consult.

OTHER FETAL

2VC or SINGLE UMBILICAL ARTERY
Make sure that the 4 chamber view and the outflow tracts are visualized in order to avoid a fetal echocardiogram.
DICTATE:
“Recommend followup at 28-32 weeks to assess fetal growth.”

UMBILICAL VEIN VARIX
Follow up for growth at 28 weeks gestation.

ECHOGENIC BOWEL
The bowel should as echogenic as bone to call echogenic bowel with tissue harmonics (THI) off. Discuss this with the genetic counselor in order to have the patient counseled. Amniocentesis may be offered. Follow up is performed at 6 week intervals: 28 weeks.
DICTATE:
“The bowel is echogenic which is associated with infection, prior hemorrhage, karyotype abnormality, cystic fibrosis and normal outcome. Consider genetic counseling and perinatology consultation. Recommend follow up at 28 and 34 weeks for growth.”

ESTIMATED FETAL WEIGHT
EFW> 90%: “Estimated fetal weight corresponds to the greater than 90% for gestational age. Findings are suggestive of large for gestational age. Patient is at increased risk for fetal macrosomia. “
EFW<10%: “Estimated fetal weight corresponds to the less than 10% for gestational age. Findings are suggestive of small for gestational age. Further management per your algorithm. “
Examine the relative discrepancy of the abdominal circumference/femur/humerus lengths percentiles to that of the biparietal diameter/head cirfumference. If there is asymmetry (head larger than body/extremities), then raise the possibility of asymmetric IUGR. Please note that asymmetric IUGR can occur in the setting of normal estimated fetal weight, so always look out for asymmetry of the body/extremities relative to the head measurements.

PLACENTA

LOW LYING PLACENTA
If the placenta is within 2 cm of the cervical os, dictate the distance from the os to the placental edge. Ensure that the urinary bladder was empty (if called on transabdominal scan) and that the urinary bladder is empty or minimally distended (if called on translabial or transvaginal ultrasound). A distended bladder or uterine contraction can cause a fal-se-positive results by compressing the LUS.

PLACENTA PREVIA (complete: the internal os is covered by placenta; partial: partial coverage of the os; marginal: the placental edge is at the margin of the os). Ensure that the urinary bladder

was empty (if called on transabdominal scan) and that the urinary bladder is empty or minimally distended (if called on translabial or transvaginal ultrasound).
Recommend followup at 28-30 weeks (third trimester) to evaluate for resolution.

MARGINAL PLACENTAL CORD INSERTION
No need for followup unless the cord is immediately adjacent to the placental edge.
DICTATE:
"The cord enters the placenta __cm from the edge. No followup is necessary. "
If the PCI is at the edge then dictate: "The PCI is at the placental edge consistent with marginal/velamentous cord insertion. Recommend followup at 28 weeks gestational age to assess for fetal growth."

VELAMENTOUS PLACENTAL CORD INSERTION
Use color Doppler to determine whether the cord crosses the cervix to assess for vasa previa. If it does, should discuss. If no vasa previa is found.
DICTATE:
"The cord enters the membranes __cm from the placental edge. Recommend followup at 28 weeks gestational age to assess for fetal growth." If vasa previa present, then discuss as well.

OTHER

LOWER UTERINE SEGMENT IMAGING
Cervical length must be measured and dictated on all patients, along with whether it was imaged transabdominally, translabially, or endovaginally.
TV imaging of the cervix must be performed for:
All multiple gestations
H/O prior loss <28 weeks or midtrimester losses.
Any patient where satisfactory TA and/or TL images cannot be obtained.

ELEVATED MSAFP AND NORMAL US
Do not need to recommend anything. If staff is concerned (e.g. very high MSAFP),
DICTATE:
"Fetal growth should be carefully monitored with consideration for further US if needed."

RETURNING FOR AMNIOCENTESIS ONLY
<2 weeks last exam, complete biometry not needed – just BPD for lab results.
>2 weeks last exam, need complete biometry to assess growth.
OTHER FOLLOW UPS
AFTER CVS (chorionic villus sampling): 18 weeks to check anatomy: palate, outflow tracts, limbs, feet, hands, facial profile.

CALVARIUM
Cephalic index: Measure at the level of the BPD measurement. Fronto-occipital diameter (FOD) measured from outer to outer margins of fetal calvarium. CI = BPD/FOD x 100. Normal = 78.3 +/- 1 SD (so between 74 and 83 is normal). If <73, then dolichocephaly. If >83, then brachycephaly (ddx chondrodyslplasia punctata, down syndrome, cornelia de Lange syndrome). Please be sure that the head shape does not represent "lemon sign" (frontal bone concavity; neural tube defect association), "cloverleaf" (ddx camptomelic dysplasia, thanatophoric dysplasia), "strawberry shaped" (trisomy 18), craniosynostosis.
http://www.sciencedirect.com/science/article/pii/S1556858X08001072

NUCHAL TRANSLUCENCY FIRST TRIMESTER SCREENING

Low PAPP-A result. If patient has a low PAPP-A (threshold is 5% or less), then there is an increased risk of adverse pregnancy outcome (i.e., low birth weight). Recommend an additional follow-up OB ultrasound in the third trimester to evaluate for fetal growth.

Performed with a CRL between 45 and 84 mm. If less than 45 mm, then bring patient back later. If greater than 84 mm, then cannot perform NT ultrasound.

If the patient has an abnormal NT >= 3mm AND the bloodwork was sent, but the risk assessment from NTD labs does not meet significant risk for trisomy, then can perform a second trimester ultrasound and fetal echo in a low risk patient along with second trimester serum screen, although would still offer the patient diagnostic testing such as amniocentesis due to the NT >= 3mm.

NTD labs sets the following thresholds for a screen positive result (based on the combined risk assessment from NT measurement, maternal risk factors, etc).
Trisomy 21 cutoff is risk greater than approximately 1:299 to 1:308.
Trisomy 13 cutoff is risk greater than approximately 1:150.
Trisomy 18 cutoff is risk greater than approximately 1:150
Please note that the NTD report is explicit that "patient is at increased risk of trisomy ___" if the threshold is reached.

VARICELLA/POSSIBLE VARICELLA: 16-18 weeks and 22 weeks (routine anatomy, orbits and limb lengths).
TWINS: Every 4 weeks until birth after 24 weeks – earlier if discordant. All twins require endovaginal assessment of the cervix in the second trimester.
FAMILY HX HYDROCEPHALUS: 18, 22, 32 weeks.
HX SKELETAL DYSPLASIA: 16-18, 22, 32 weeks.
CONGENITAL DIAPHGRAGMATIC HERNIA: 18, 22, 32 weeks.
RETURN VISITS
Low risk and high risk patients must have any suboptimally seen anatomy reevaluated as well as:
Biometry
Choroids/vents
4CV (and outflows)
Trans and long distal spine
Kidneys
Placental location
Palate and nose/lips if >20 weeks and not previously seen.
AFI if >28 weeks.
LUS
ANY previously undocumented anatomy and ANY anatomy relevant to previously documented anomalies.
DICTATION DISCLAIMERS
MBH= Due to maternal body habitus, visualization of fetal anatomy is limited.
EGAD= Due to early gestational age, evaluation of fetal anomalies is limited.
DSD= Lack of ossification of the distal spine is normal for this gestational age, but it precludes exclusion of neural tube defects.

TABLES
Amniotic fluid index
Stomach
Femur/BPD/HC/AC

ABNORMAL INTRAUTERINE GESTATIONAL SAC:
Transabdominal approach double decidual sac with MSD (mean sac diameter) 10mm or greater, failure to detect yolk sac when MSD 20 mm or greater, failure to detect embryo with cardiac activity when MSD 25 mm or greater.

Transvaginal approach .failure to detect yolk sac when MSD 8 mm or greater, failure to detect cardiac activity when MSD exceeds 16mm.

Follow-up ultrasound should be obtained in equivocal cases to obviate the risk of terminating a normal IUP.

FETAL DEMISE:
Discrimanatory embryonic length for detecting cardiac motion: 5 mm (transvaginal ultrasound), 9 mm (transabdominal ultrasound)
When embryonic length exceeds the discriminatory length and cardiac activity is absent, a non-viable gestation is highly likely.
M mode and cine imaging should be obtained to document absent cardiac activity.