Obstetric Ultrasound 2nd/3rd Trimesters

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- Fetal Lie (Vtx vs Breech) – Self explanatory
- Cervix/Cord/Placenta/Fluid
- Measurements (Biometry)
- Survey/ BPP
- ACR/AIUM/ACOG/SRU guidelines for Obstetric US

Cervix

- Normal > 3 cm, closed
- Shortened and closed (effaced)
- Dilated internal os (funneled)
- May be dynamic
- May need TVS
- Rx: cerclage/pessary/bedrest

Cervical length changes with pressure/ bladder distention

Cervix - TA

Normal TV

Open
Umbilical Cord

- 3 VC
  - 2 arteries and one vein
- 2 VC
  - one artery and one vein (same size)
  - increased risk anomalies/IUGR
- Vellamentous Cord
  - Inserts into the membranes

Placenta

- Location re: cervix
- Location re: uterine wall
- Staging - no real value
  - decisions based on fetal status
- Masses
**Placenta Previa**
- Relationship of placenta to internal os
- Established AFTER 16 weeks
- No previa (over 2 cm away)
- Low Lying (within 2 cm)
- Previa – overlying internal os ➔ 1/200 births

**Placenta Previa**
- If low lying or previa is found: follow-up at 32 weeks
- If still low lying or previa: follow-up at 36 wks
- Consider TVS with color to exclude vessels over the os

*NIH Executive Summary on Fetal Imaging; Ob Gyn2014; 123:1070

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**Placenta Previa**

**Vasa Previa**

**Placenta Acreta**
- Abnormal placental attachment ➔ Typically at a scar
- Acreta-Increta-Percreta ➔ Myometrial depth
- Increased risk after C-section
- Increased risk with venous lakes, anterior previas
Placenta Cysts vs Tumors
- typically simple
- fetal surface
- near cord insertion
- if large, associated with IUGR
- chorioangioma
- solid
- anywhere
- typically benign
- if large, vascular shunting and fetal hydrops

Amniotic Fluid
- Oligohydramnios
  - Mild-moderate-severe
- Polyhydramnios
  - Mild-moderate-severe
- Subjective vs AFI
  - 4 Quadrant measurements
- Look for an explanation
Measurements (Biometry)

Know the rules!
- Head
- Abdomen
- Femur

Measurements

Follow the rules!
- optimize the image
- correct plane and correct endpoints
- small error pre-viable is not clinically significant
- error more important at extremes
  - recognize the large scale errors

Head Measurements: BPD
- largest possible, along skull base
  - symmetrically positioned 3rd ventricle/thalami
  - falx down the middle, CSP anteriorly
- calvaria smooth and symmetric
- cursers:
  - outer to inner
  - leading edge to leading edge

Abdomen Diameter Measurements
- level of liver (largest intra-abdominal organ in fetus)
- stomach and intrahepatic umbilical vein
  - Junction of left and right portal vein
- skin edge to skin edge
Abdominal Measurements

When struggling-
- Round is best
- Keep AD measurements within 10 mm of each other
- This gives a pretty good estimate even without other landmarks

Mistake
Fetus is prone - landmarks obscured by spine

Correct
Measurements: Femur
- long axis of the bone (ossified portion) parallel to transducer
- epiphysis is excluded
- measure at junction of cartilage and bone
  ➔ NOT the longest echogenic point (the "distal femoral point") which has no anatomic correlate

Mistake
all of abdominal wall is not included

Correct

Mistake

EFW 3971 gms
BW 4850 gms
Vaginal delivery c/b shoulder dystocia
Severe hypoxemia; baby died DOL 2 hypoxemia and acidosis
Measurements (Biometry)
- >90% macrosomic
  - > 4500 gms – C section (9,15)
  - > 4000 gms in diabetic (8,14)
- < 10% IUGR
  - 80% small/20% sick
  - only < 5% are really IUGR

2/3 trimester: Anatomy
- CNS
- Heart
- Thorax
- Abdomen
  - GI/GU
  - Abdominal wall

Head
- Normal/normal variants
- Chiari Malformation
  - Lemon/Banana
- Hydrocephalus
- Hydranancephaly
- Holoprosencephaly

Cerebral Ventricles
- plane must be level
  - Off axis measurement will increase size
- always use the smallest technically accurate measurement
- all errors result in larger size ventricle

Lateral Ventricle
- Choroid Plexus Cysts
Chiari Malformation
- Lemon/ Banana
- Spine defect
- ** Need Sagittal Image

Fluid in the Brain
- Holopros  Hydranen  Hydroceph
  - Faix  No  Yes  Yes
  - Cortex  Yes  No  Yes

Holoprosencephaly
- Faix  No
- Cortex  Yes

Hydranencephaly
- Faix  Yes
- Cortex  No
Hydrocephalus

Falx Yes
Cortex Yes

Heart

- 4 chamber
- Aorta and Pulmonary Outflow Tracts
- 3 Vessel View
- Clips are mandatory
- Color?

Cine clip is critical
Heart
- 4 Chamber only is not enough
- Technique critical with Ao and PA
- Ao must be imaged in axial plane, with RV and septum on image

Thorax
- Diaphragmatic hernia
- CPAM/ sequestration
- Tracheal/bronchial atresia
Amiri L CDH chest

Conley huge CCAM fills entire R chest 21wks.avi

Nastanski tracheal atresia

17 weeks

Tracheal Atresia

Abdomen/ Kidneys

- Caliectasis/hydronephrosis
- Posterior urethral valves
- Multicystic dysplastic kidney
- Autosomal recessive polycystic kidneys
- Often affects fluid (DNS)

Davis R UVJ 36 w , Silva hydronephrosis hydroureter 38wks.avi

Hydronephrosis

Posterior Urethral Valves
Abdomen/ GI
- Stomach
- Dilated bowel loops
- Perforation/ Meconium Ileus
- Often affects fluid (↑)

Duodenal Atresia

Small Bowel Obstruction

Meconium Peritonitis/ SBO
Abdominal Wall

- **Gastroschisis**
  - free floating loops of bowel
  - defect to the right of CI
  - ascites impossible

- **Omphalocele**
  - membrane covered protrusion
  - Cord inserts into mass
  - ascites possible

- **Douglas cleft lip and TGA**

- **Omphalocele**
  - + Membrane
  - CI into mass

- **Gastroschisis**
  - No membrane
  - Normal CI
Nucahl cord (Kosar) Nuchal cord Valdez 8 BPP extremity movement.avi

Sayag sticking tongue out 30 wks 3D yawning fetus

And….

BPP:
2 AVF
2 Movement
2 Tone
2 Breathing

2/3 Trimester
- Measurements
- Survey
- Some abnormalities develop over time
- Don’t call something unevaluable without considering it might be abnormal