***Fetal Anatomy and Biometry***  
  
*Michelle Wilson Ed.D, RDMS, RDCS, FSDMS  
DMS 333*

Fetal Presentation

Vertex/cephalic or breech longitudinal lie

Fetal Presentation Transverse

Fetal head to maternal right or left transverse

Fetal Presentation Breech

Three types of breech

Frank, footling and complete

Fetal Head

By 12 weeks some structures can be seen   
in the fetal head

The fetal head is used for measuring purposes after 12 weeks

Locate fetal spine and follow to head

Rotate 90 degrees when head is found

Lateral ventricles easiest to identify and filled by the choroid plexus

Choroid Plexus

Fetal Head – 15 weeks

Midline echoes of falx divides cerebral hemispheres

Thalamus is midline hypoechoic structure

Anterior to thalamus is the third ventricle

Sylvian fissure near lateral aspect of skull; middle cerebral artery noted near

Cavum septum pellucidum anterior to   
third ventricle

Fetal Head Measurements BPD/HC

BPD/HC

Biparietal Diameter (BPD)

Done by 12 weeks

Look for following structures

Measurement taken from inner border of cerebral cortex to outer border or vice versa

BPD Level

Occipital Frontal Diameter (OFD)

Taken at same level as BPD

Markers are placed on the outer borders of the cortex from front to back

Occipital Frontal Diameter

Head Circumference (HC)

Done the same as OFD, only area markers are used to circle the head

If area markers are not available the following formula can be used

*HC = BPD + OFD X 1.6*

Head Circumference

Cerebellum

Angle posterior and inferior from level of BPD

Located on the posterior aspect of the brain

Measure in a transverse plane from edge   
to edge of cerebellum

Aids in fetal age determination in cases   
of intrauterine growth retardation (IUGR)

Cerebellum

Cisterna Magna

Located adjacent to the cerebellum and occipital bone

Thin sonolucent area

Measured from the cerebellum edge to the calvarium edge

Cisterna Magna

Cisterna magna measurement helps to diagnose

Cerebellar hypoplasia

Communication hydrocephalus

Dandy-Walker cysts

Small measurements may suggest spinal abnormalities

Cisterna Magna

Cavum Septum Pellucidum

Anterior to thalamus

Small slit-like structure anterior to thalamus

Thalamus vs. Peduncles

Outer Ocular Distance (OOD)

Use orbitomeatal line which is 2-3 cm below BPD

Done from the lateral edge of orbit to opposite lateral edge

Outer Ocular Distance

Inner Ocular Distance (IOD)

Taken at same level as the OOD

Done from medial edge of orbit to opposite medial edge

Inner Ocular Distance

Facial Views

Image the parents like

Profile image to show normal structures

Frontal image also displays normal structures

Observe facial movements

Profile

Frontal Face

Soft Palate

Types of Cleft Palate

Soft Tissue Nose/Lips

Types of Cleft Lip

Cleft Lip/Palate

Profile with Cleft Palate

Fetal Spine

Long echogenic parallel structure ending   
in a point at sacrum

Image on both longitudinal and transverse planes

Ossification centers in a triangle formation

Adjust technique

Decrease dynamic range/compression

Decrease field of view, zoom, depth

Fetal Spine

Fetal Thorax

Locate ribs and heart

Heart and lungs only structures seen

Fetal lungs less echogenic than liver until 3rd trimester

Fetal Diaphragm

Locate diaphragm in sagittal plane

Stomach and apex of heart should be on the left side – confirm situs

Rule out diaphragmatic hernia

Diaphragm

Four-chamber Fetal Heart

Most important

Easiest to obtain

Done in transverse   
plane

Evaluate for

2 atria

2 ventricles

Valves

Interventricular septum

Interatrial septum

Identification of Heart Anatomy

LA closest to the spine

Ventricles should be about the same size

Check for IVS and IAS defects

Four-chamber Heart

Heart Situs

Determine right and left sides of heart

LA closest to spine

Apex 45 degrees to left anterior chest wall

Aorta seen opening towards the LV

Approx. 65% of anomalies seen from   
4-chamber view

Approx. 85% seen if great vessels are imaged

Aortic Outflow Tract

Images the aorta as it comes out of the left ventricle

IVS

Pathology imaged

Overriding aorta

Transposition

IVS defects

Aortic Outflow

Pulmonary Outflow Tract

Image

Cross section of ascending aorta

Ductus arteriosus

Pulmonary artery

Right pulmonary artery wraps around aorta

Pulmonary Outflow

Heart Scanning Tips

Four-chamber

Transverse on fetal chest

Aortic outflow

Angle probe to right shoulder from 4 ch

Pulmonary outflow

Slide transducer to head of fetus from 4 ch

M-mode/Pulsed Doppler

Evaluate cardiac motion

Heart rate

Chamber size and wall thickness

Systolic and diastolic function

Rhythms

Premature atrial contractions (PACs) most common

Usually benign

Seen at 25-35 weeks

M-mode/Pulsed Doppler

Technique Hints

Make M-mode/Doppler strip largest portion of image

Increase sweep speed

Measure peak systole to peak systole for FHR

Decrease dynamic range of Doppler or  
M-mode tracing

Helps measuring

Fetal Circulation

IVC

RA

Foramen ovale

LA to LV

Aorta

Pulmonary trunk bypassed by the ductus arteriosus

Fetal Abdomen

Locate stomach directly below diaphragm

Apex of heart should be on same side as stomach

Gallbladder may be seen

Umbilical insertion site for hernias

Umbilical vein seen in liver

Aorta/IVC seen in transverse plane

Stomach/Cord Insert

Abdominal Measurements

Find longitudinal spine and fetal heart,   
turn 90°

Move inferior to 4-chamber heart to locate stomach

Level to use

Umbilical vein

Stomach

Fetal Abdomen

Abdominal Measurements

Area markers placed at skin level around the abdomen

Alternate method

AP/transverse diameter

Use formula

AC=AP + TR X 1.6

Scanning Tips

Transducer pressure can deform the abdomen shape

Renals and cord insert should not be seen

Fetal Kidneys

Slightly inferior to stomach

Usually identified by 16 weeks

Approximately 3-4 cm in length

Small amount of fluid in calyces is normal

Take up no more than 1/3 of the abdomen

Hypoechoic to surrounding tissue

Lateral to lumbar spine

Fetal Renal

Fetal Bladder

Should be seen on all exams after 12 weeks

Fills and empties every hour or so

Identification of bladder assures at least some renal function

Look for over-distended bladders

Fetal Bladder

Fetal Genitalia

Identify gender if possible

Certain birth defects   
are gender specific

Find bladder and angle inferior

Male genitalia

See scrotum and penis

Small hydrocele is normal

Turtle sign

Fetal Genitalia

Female

Hamburger sign

Pitfalls

Umbilical cord between legs, use CDI

Swollen labia mimic testicles

Fetal Extremities

Locate arms, legs, feet and hands

Determine if feet and hands are on the correct plane

Determine if correct number of bones are present

Radius and ulna

Tibia and fibula

Use long bones for additional measurements   
if other measurements do not correlate

Femur Length

Locate fetal bladder and turn approx. 90°

Humerus can appear as femur

Obtain longest length of bone

Measure end to end to exclude the   
ossification centers

Femur Length

Femur Length

Questions