

1 **Cervix, Amniotic Fluid, Umbilical Cord**

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2 **Cervix**

- Cervix should measure approximately 3 cm
- Closed cervix has no fluid within and appears "V" shape at internal os
- Bulging of membranes through the external os is a poor prognostic sign
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3 **Vaginal Cervix**4 **Labial Sonography**

- Image lower uterus and cervix regions
- Place draped transducer over labia minora
- Sagittal plane
- Image internal cervical os and lower placenta

5 **Labial Sonography**6 **Umbilical Cord**7 **Umbilical Cord**

- Two arteries, one vein
 - Arteries carry deoxygenated blood
 - Vein carries oxygenated blood
- Blood to fetus
 - via vein
- From fetus
 - via arteries

8 **Umbilical Cord**

- Usually arises from mid placenta
- Wharton's Jelly appears as echogenic material around the cord
- Diameter typically between 1-2 cm
- Length approx. 40-60 cm

9 **Umbilical Cord**

- Visualizing two arteries on each side of bladder confirms three-vessel cord
- Should use color Doppler imaging (CDI) or power Doppler imaging (PDI)

10 **Single Umbilical Artery**

- Associated with
 - Congenital anomalies
 - IUGR

16 **Indications for Umbilical Cord Doppler**

- Maternal disease
 - Hypertension
 - Renal
 - Diabetes
 - Malnutrition
 - Autoimmune problems (Rh sensitization)
- IUGR
- Umbilical anomalies
- Previous fetal demise
- Chromosomal anomalies

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- *Systole*
 - Pulsatile Waveform
- *Diastolic*
 - Steady and continuous waveform

18 19

- *Increased Resistance*
 - Decrease Mean Velocity
 - Development of a notch in the early diastolic portion of the velocity waveform caused by destructive interaction between outgoing and reflected waves

20 **Amniotic Fluid**

- Seen throughout pregnancy
- Increased in first and second trimesters
- Decreased in third trimester
- Small reflectors in fluid is vernix
 - Vernix increases at term

21 **Production of Amniotic Fluid**

- First Trimester
 - Cells lining amnion secrete AF
 - Water diffuses across chorion frondosum
 - Prior to kidney function, passive diffusion from fetus across skin
 - Amnion covering cord also involved
- 12 Weeks
 - Fetal kidneys produce majority of fluid through urination

22 **Function of Amniotic Fluid**

- Aides symmetrical growth

- Cushions fetus
- Prevents adhesions
- Freedom of movement for fetus
- Aides in lung development
- Maintains constant temperature for fetus
- 98% water, 2% solids

23 **Resorption of Amniotic Fluid**

- Ingested by fetus
 - only small amt. related to urine production in early to mid pregnancy
- At term rate of ingestion = urine production
- Equilibrium must be maintained

Production	Re-absorption
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24 **Amniotic Fluid Index**

- Fluid determined by measuring fluid pockets
- Measure four pockets free of fetal parts or umbilical cord

25 **Abnormal Volume of AF**

- Polyhydramnios:
 - >2000-3000ml in 3rd Trimester
 - Indicator of possible fetal abnormality
 - LGA with tight abdomen
 - Causes of Polyhydramnios
 - Idiopathic- <50% unknown
 - Maternal causes:
 - Diabetes
 - RH incompatibility
 - Pre-eclampsia
 - CHF
 - Syphilis or infections

26 **Polyhydramnios:**

- Causes due to fetal abnormality:30%
 - NTD and CNS (45%)-
 - Anencephaly, meningocele, encephalocele, hydrocephaly, hydranencephaly
 - GI Anomalies-
 - Duodenal atresia
 - Double Bubble sign:
 - fluid filled stomach
 - fluid filled duodenum
 - fluid not passed to small bowel for absorption. Esophageal atresia, jejunal atresia, diaphragmatic hernia

27 **Polyhydramnios: Causes due to fetal abnormality cont.**

- Multiple gestation
- Grossly malformed fetus
- Circulatory Abnormalities:
 - Cardiac arrhythmias, coarctation of aorta,
 - fetal hydrops, any compromising congenital defect of the heart.
- Miscellaneous:
 - Teratomas, Pulmonary hypoplasia, Trisomy 18 & 21, Cystic hygroma

28 **Polyhydramnios: Sonographic Characteristics**

- Excessive fluid
- Free floating fetal body
- Placenta appears thin

29 **Oligohydramnios:**

- Volume- <500ml
 - Poor acoustic window
- Causes of oligohydramnios:
 - Premature rupture of membranes
 - or leaking membrane
 - increased risk of infection and fetal demise
 - IUGR
 - intrauterine growth restriction

30 **Causes of oligohydramnios cont.**

- Structural urinary abnormalities:
 - Renal Agenesis (Potters Syndrome)
 - congenital absence of kidneys
 - polycystic kidney disease
 - Renal obstruction-
 - large fetal bladder that does not empty due to bladder neck or ureteral obstruction
 - ureteral obstruction

31 **Structural Urinary Abnormalities**

- General guidelines for evaluating renal disease:
 - Differentiate adrenal glands from kidneys when determining size
 - Check texture of kidneys
 - hypoechoic relative to liver
 - Renal size should be no more than 1/3 of the total abd. volume

32 **Other Causes of Oligohydramnios**

- Post maturity/Post term pregnancy
- Fetal demise
- Intrauterine infection

33 **Oligohydramnios**

- Severe decrease in amniotic fluid

- Associated with
 - Genitourinary defects
 - Intrauterine growth restriction
 - Premature rupture of membranes (PROM)

34 **Conclusion**

- Placenta
 - Function
 - Size
 - Location
 - Grading/maturation
 - Pathologies
- Umbilical Cord
 - Masses
 - Dimensions
 - Knots
 - Nuchal cord
 - Single artery
- Cervix
 - Measurements
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