Evaluation of the Placenta and Cervix

Judy A. Estroff, MD

Boston Children's Hospital
Harvard Medical School
Boston, MA

Disclaimer

- I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of any commercial services discussed in this CME activity.
- I do not intend to discuss unapproved or investigative use of a commercial product/device in my presentation.

Everything you need to know in 15 minutes!

Overview

- Amniotic fluid
- Placenta
- Umblical cord
- Cervix
- Membranes

Amniotic Fluid

- Definitions
- Classification

Amniotic fluid volume

- Increases logarithmically first ½ pregnancy
- < 10 mL @ 8 weeks gestation
- 630 mL @ 22 weeks gestation
- 770 mL @ 28 weeks gestation
- 30-36 weeks: volume stable or slowly inc
- > 36 weeks: volume decreases
- 41 weeks: 515 mL
- Decreases 33% each week after 41 weeks

Creasy & Resnik: Maternal Fetal Medicine 6th Edition. 2009

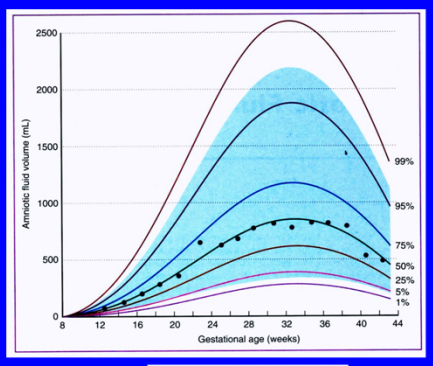


FIGURE 3-1 Amniotic fluid volumes from 8 to 44 weeks of human gestation. Dots represent mean measurement for each 2-week interval. Shaded area covers the 95% confidence interval (2.5 to 97.5 percentiles). (From Brace RA, Wolf EJ: Normal amniotic fluid volume changes throughout pregnancy. Am J Obstet Gynecol 161:382-388, 1989.)

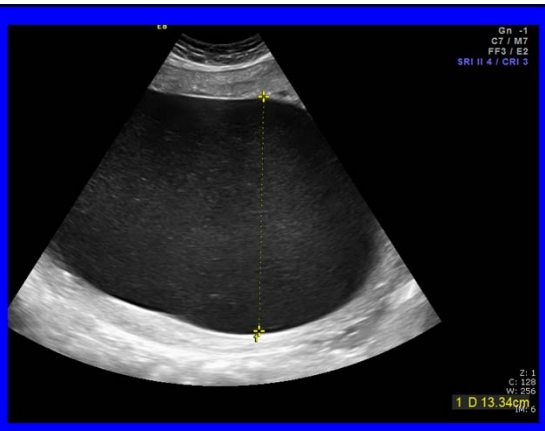
Measurement of amniotic fluid

- AFI= Amniotic fluid index
- Subjective assessment
- Deepest vertical pocket

AFI: Amniotic Fluid Index

- Definition:

  Summation of the deepest vertical pocket (DVP) in 4 cord and extremity-free quadrants of the gravid uterus
- Oligohydramnios: < 5 cm
- Polyhydramnios: > 24 cm



27w DVP=13.3 cm

Oligohydramnios

- Definition: Condition in which the amniotic fluid volume (AFV) is decreased relative to gestational age.
- Or: AFI < 300-500 mL in 2nd trimester
  - MVP < 1-2 cm
  - AFI < 5 cm
  - AFI < 5% of expected

Oligohydramnios

- Almost always associated with an increased risk of fetal morbidity and mortality

Oligohydramnios: Causes

- Renal: agenesis, obstruction
- Uteroplacental insufficiency/ IUGR
- Ruptured membranes
- Post term pregnancy
- Unknown

Oligohydramnios

- Associated with guarded outcome
- Highly associated with anomalies
- Not universally fatal, depends upon gestational age at onset (after 26 weeks, fetus may have enough pulmonary development to survive)

History

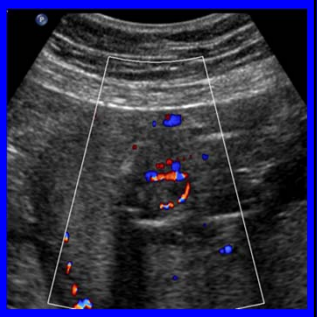
- 19 weeks 2 days gestation
- Referring dx: bilateral renal agenesis, oligohydramnios
- Family hx: Branchio-oto-renal syndrome

Branchio-Oto-Renal Syndrome:

BOR; Melnick-Fraser Syndrome

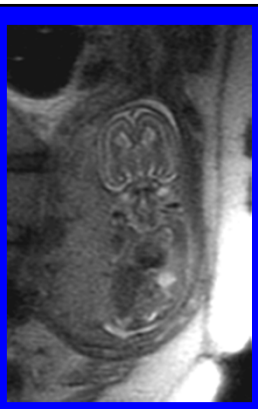
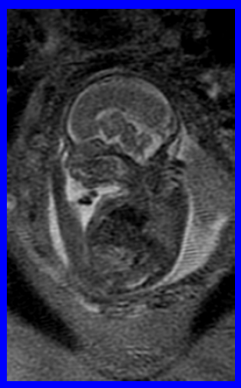
- Autosomal dominant
- Variable expression and penetrance
- Chromosome 8q13.3; EYA1 gene
- **Renal**: dysplasia, aplasia, polycystic kidney, reflux

19w2d



UAs: no fluid in bladder

19w2d

19w2d: kidneys not seen

Polyhydramnios

- Definition: Excessive accumulation of amniotic fluid at some time during pregnancy
- Greater than 1500-2000 mL
- Deepest vertical pocket > 8 cm

Polyhydramnios

- Often associated with an increased risk of fetal morbidity and mortality

Polyhydramnios: Causes

- Idiopathic
- LGA fetus
- Impaired swallowing (neck mass, EA/TEF, DA, CPAM
- Chromosomal
- Neurologic

Polyhydramnios: Causes

- CNS: ie, anencephaly
- GI: Esophageal atresia
- Respiratory: CCAM
- GU: Mesoblastic nephroma
- CV: Ebstein anomaly
- MSK: Fetal akinesia/hypokinesia syndrome

Placenta

Placenta

- Normal sonographic appearance
- Normal thickness
- Previa types
- Accreta types
- Cysts, masses, molar change
- Chorioamniotic separation
- Amniotic bands, senechiae

Placenta: normal appearance

- Thickness: less than 5 cm
- Attachment site: anywhere
- “Matures” during gestation (Type 0-3)
- Placental lakes
- Accessory lobes

Placental cord insertion site

- Central
- Eccentric
- Velamentous

Position of placenta in relation to internal os of cervix

- Low-lying
- Marginal previa
- Central previa
- Vasa previa

Invasive placenta

- Increased with previous C-section
- Previous uterine surgery
- Difficult to diagnose
- Treatment options: methotrexate, uterine artery embolization, hysteroscopy, gravid hysterectomy

Invasive placenta

- Accreta (80%):superficial invasion chorionic villi
- Increta (15%): deep myometrial invasion
- Percreta (5%): full thickness invasion of myometrium, often into adjacent bladder

Abnormal placenta

- Trophoblastic disease
- Masses: cystic and solid
- Hydropic change

Umbilical Cord

Cord Issues

- Number of vessels
- Cord length
- Coiling index
- Cord insertion sites: fetus, placenta
- Cord position in relation to fetus
- Cord masses: fetal end, placental end, free-floating cord

Umbilical cord cysts

- Usually benign, but not always
- Most often on the fetal end
- Represent remnants of allantoic duct (urachus) or vitelline duct

Case of urachal remnant

Importance of cord insertion site

- Into fetal abdomen
- Into placenta

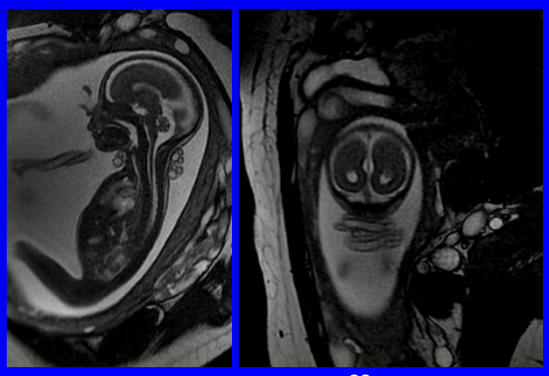
Abnormal cord insertion sites

- Eccentric
- Marginal
- Velamentous

Cord

- 2 vessel, 3 vessel, more
- Umbilical cord cysts
- Umbilical cord varix
- Short cord
- Coiled, uncoiled
- Nuchal cord

Nuchal cord



22w

Nuchal cord

- ~ 25% of pregnancies have a "single" nuchal cord
- ~2% have "double" nuchal cord
- 0.3% have a triple nuchal cord
- <0.1% have a quadruple cord

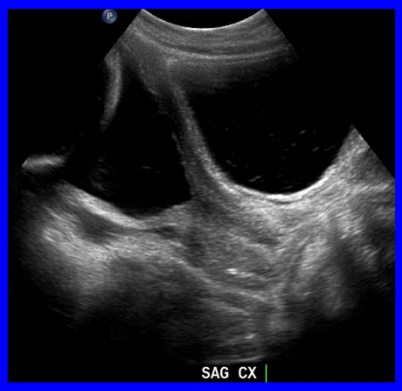
Single umbilical artery

- Incidence: 1% live births
- Association with anomalies

Cervix

Cervix

- Normal anatomy
- Expected changes during pregnancy
- Normal length
- Short cervix
- Open cervix
- Imaging of the cervix: TA US, TV US, MRI



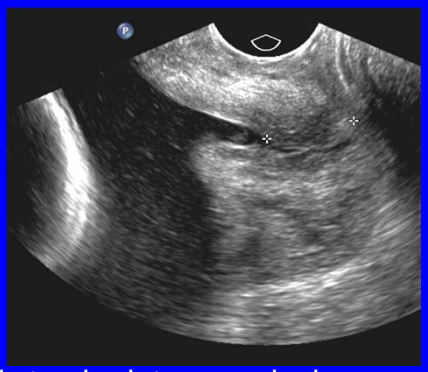
Normal cervix= 3 cm or longer

Note: central cord insertion

22w Cervix: long and closed, no funneling

Cervix length can change!

23w6d



1.8 cm

Gold standard=transvaginal sonography

23w6d

Warning!

- Evaluation of placenta, cervix and amniotic fluid is not just for coding purposes
- Critical to good outcome for the pregnancy
- Treat woman carrying an anomalous fetus like any other pregnant woman: maternal and fetal well-being first and foremost, before anomaly evaluation

Report of major impact: Asymptomatic short cervix

Vaginal progesterone in women with an asymptomatic sonographic short cervix in the midtrimester decreases preterm delivery and neonatal morbidity: a systematic review and metaanalysis of individual patient data

Roberto Romero, MD, Kypros Nicolaides, MD, Agustin Conde-Agudelo, MD, MPH, et al. *American Journal of Obstetrics and Gynecology* 206(2):124.e1–124.e19, February 2012

Universal cervical length screening and vaginal progesterone

- Prevents preterm births
- Reduces neonatal morbidity
- Reduces health care costs

- "Doing nothing is no longer an option."

-Stuart Campbell

Membranes

- Chorioamniotic separation
- Amniotic bands

Amniotic bands

- "Sticky" side of amnion attaches to fetus
- Unusual clefts, defects

Significance of chorioamniotic separation

- Guarded outcome
- Depends upon whether it is spontaneous (worse) or after an intervention (better)
- Can re-seal

Review

- Amniotic fluid
- Placenta
- Umblical cord
- Cervix
- Membranes