1 **Amniotic Fluid and Amniotic Bands**

Michelle Wilson Ed.D, RDCS, RDMS

2 **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

3 **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

4 **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

5 **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

6 **Amniotic Fluid Index**

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

7 **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
- –Syphillis or infections

8 **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

9 **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

10 **Polyhydramnios: Sonographic Characteristics**

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

11 **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

12 **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

13 **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

14 **Other Causes of Oligohydramnios**

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

15 **Oligohydramnios**

- Severe decrease in amniotic fluid
- Associated with
  - Genitourinary defects
  - Intrauterine growth restriction
  - Premature rupture of membranes (PROM)

16 **Amniotic Band Syndrome**

Entrapment of fetal parts in fibrous amniotic bands
Strong relationship with club foot exists

17 **Amniotic Band Sonographically**

18 **Amniotic Sheets or Synechia**

- Typically have clinical history of uterine instrumentation
- Often an incidental finding
- Usually don't interfere with fetal growth
-

19 **Synechia Sonographically**

- Shelf-like band
- Communicates with uterine wall
  - Base and free edge
- Good vascular flow

20 **Circumvallate Placenta**

- Raised and folded edge of chorion
  - May appear as a band crossing the gestational sac
  - Can have antenatal complications
    - Bleeding and preterm labor

21 **Amniotic Band vs Synechia**

1 Band

2
- Freely criss-cross amniotic sac
- Often multiple
- Attached to fetal body parts
- Anatomical abnormality often present
- Associated with Limb Body-Wall complex

3 Synechia

4 • Shelf-like structure associated with placental edge. In orthogonal views, the placental edge appears folded or curled.
- Good vascular flow
- Clear of fetal parts
- Often have history of instrumentation

22 **Band-like Structures in Uterus**

- Differentials
  - Chorio-amniotic separation
  - Velamentous cord insertion
  - Uterine fusion abnormalities
  - Remaining membranes after demise of twin
-

23 **Conclusion**

- Amniotic Fluid
  - First trimester
    - Skin, Cells lining Amnion, Water across chorion frondosum, Amnion covering cord
    - 12 weeks-Kidneys kick in
  - Polyhydramnions vs oligohydramnios
  -
- Band-like Structures
  - Amniotic Bands
  - Amniotic Synechia
- Frequently visualized in uterus?
- Can the fetus freely move away from band?
- Is there color or flow in the structure?
- Any anomalies?
  -