Fetal Anterior Abdominal Wall Defects

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Fetal Abdomen

Ventral Wall Defects
Relation to Umbilicus

- Above umbilicus
  - Consider pentalogy of cantrell
- At umbilicus
  - Consider gastroschisis or omphalocele
- Below umbilicus
  - Consider extrophy of bladder or cloaca
- Difficult to tell because of size
  - Consider body stalk anomaly

Omphalocele
- Central defect
- Associated anomalies are common
- High risk of aneuploidy

Gastroschisis
- Periumbilical defect
- Associated anomalies are uncommon
- Little to no risk of aneuploidy
- High rate of bowel related complications
- Associated with substance abuse & medications
**Omphalocele**

- Herniation of intraabdominal contents into the base of the cord
- ALWAYS covered by a membrane

**Omphalocele**

- Umbilical cord inserts onto membrane
- In large defects may be displaced eccentrically
- The herniated bowel is **NOT** directly exposed to amniotic fluid
- Bowel usually does not thicken or dilate

**Is This an Omphalocele?**

**Pseudo-Omphalocele**

Caused by scanning oblique or by excessive transducer pressure

**Omphalocele**

*Can be a small or large wall defect*

**Omphalocele**

- Small
  - Failure of normal midgut rotation
  - Cord *midpositioned*
  - Usually contains **only bowel**
  - Associated with *chromosomal anomalies*
Omphalocele

- Large
  - Failure of anterior abdominal wall closure
  - Cord eccentric
  - May contain organs
  - Scoliosis
  - Associated with structural anomalies

Measurements of AC inaccurate and should be excluded from biometric calculations

Omphalocele

- IUGR has been reported in 20% of patients
- 50% have associated anomalies (20% cardiac)
- 30% are associated with trisomy 13 & 18

Diagnostic Challenge

- Omphalocele and cord cyst may co-exist
  - Whartons jelly cyst – mucoid degeneration of Wharton Jelly
  - Allantoic cyst – always near insertion site
  - Omphalomesenteric duct cyst – associated with intraabdominal mesenteric cysts

Diagnostic Challenge
Cystic Ventral Mass Arising at the Umbilicus

Diagnostic Challenge
Separate from but contiguous with the bladder

Patent Urachus With Allantoic Cyst
Urachus is an embryological remnant of the allantos which runs from the apex of the bladder through the umbilical ring to terminate in the proximal umbilical cord

Gastroschisis
Incidence is 1 in 3000 births
- Varies considerably with maternal age
- Strong association reported among younger patients
- Less likely for organ herniation
- Variable amounts of bowel herniated
- Bowel floats within amniotic fluid

Gastroschisis
Hepatic herniation is less frequent with gastroschisis than with omphaloceles
**Gastroschisis**

- Small defect (2-4 cm)

**Gastroschisis**

- Associated anomalies in about < 10% of fetuses
- IUGR in up to 50%
- No chromosomal abnormalities

**Gastroschisis**

- Oligohydramnios
  - More common than polyhydramnios
  - Suggest fetal distress

- Polyhydramnios
  - Suggest bowel obstruction or atresia

**Gastroschisis**

- Marked bowel dilatation, which may be either external or internal to the abdominal cavity, suggests bowel obstruction and/or ischemia

**Gastroschisis**

- Bowel can twist and cut off blood supply

**Gastroschisis**

- Associated anomalies in about < 10% of fetuses
- IUGR in up to 50%
- No chromosomal abnormalities
Normal Midgut Herniation

- Fetal bowel normally herniates into the base of the umbilical cord at approx. the 7-8 weeks MA
- Detected sonographically from 9-11 wks
- Should not be visible by 12 weeks

This appearance should not be mistaken for a ventral wall defect
Pentalogy of Cantrell

A term used to describe the association of 5 anomalies:
1. Midline supraumbilical abdominal defect
2. Defect of the lower sternum
3. Defect of the diaphragmatic pericardium
4. Anterior diaphragmatic hernia
5. Intracardiac abnormalities

Pentalogy of Cantrell – US Findings

- Midline anterior wall defect usually upper abdomen
- Ectopic heart
- Pericardial or pleural effusion
- Craniofacial anomalies
- Ascites
- Two vessel cord

Ectopic Cordis

- Rare malformation
- Protrusion of heart through chest wall
- Association - Pentalogy of Cantrell
**Limb-Body Wall Complex**

- Also known as “body stalk” anomaly
- Failure of ventral abdominal wall to close
  - Often left sided

**Limb-Body Wall Complex**

- Abdominal organs lie in a sac outside the abdominal cavity
- Short or absent umbilical cord
- Fetus lies directly on placenta
- Universally fatal

**Limb-Body Wall Complex**

- Amniotic bands attached broadly to the fetus & placenta
- Large thoraco-abdominal wall defect
  - no covering membrane
- Distorted body axis

**Limb-Body Wall Complex**

- Severe scoliosis – prominent feature
- Limb defects common
- Complex array of multiple malformations
  - Craniofacial & Internal organ anomalies

**Bladder Exstrophy**

- A very rare congenital malformation
- Failure of closure of lower abdominal wall resulting in exposed bladder into the amniotic cavity
Bladder Exstrophy – Caution

• Do not confuse cystic pelvic structures with bladder
• Normal bladder fills & empties repeatedly during scan

Bladder Exstrophy – US Findings

• Non-visible bladder in fetal pelvis
• Bulging mass protruding from the lower abdominal wall
  – Large infraumbilical anterior wall defect
  – Irregular and lobulated surface
• Normal kidneys
• Normal amniotic fluid volume

Bladder Exstrophy – Caution

• Inferiorly displaced umbilicus
• Small penis with anteriorly displaced scrotum
• Splayed iliac bones

Bladder Exstrophy – US Findings

• Determine the site of the defect with respect to the umbilicus

Anatomy

• Umbilical arteries arise from the EIA's and run on each side of the bladder before entering the umbilical cord

Bladder Exstrophy – Caution

“Look for a landmark”
**Cloacal Exstrophy**

Defect extends inferiorly and the bowel loops extrude between the two bladder halves

Omphalocoele & bladder exstrophy

1. Large infraumbilical anterior wall defect
2. Absent bladder
3. Neural tube defects
4. 2-vessel cord
5. Malformation of the genitalia
6. Imperforate anus

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Thank You