FETAL MRI OF ABDOMINAL WALL DEFECTS

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PRENATAL WORK UP AWD

• AWD range
  • very simple (umbilical cord defect)
  • highly complex (cloacal exstrophy or LBWC)
  • all: abd content herniation through ventral wall

• Correct dx, vital:
  1. Appropriate management and referral
  2. Accurate parental counseling

KEY TO DX: UMBILICAL CORD INSERTION
OBJECTIVES

• Fetal MR review of abdominal wall defects
  1. Umbilical cord defect
  2. Gastrochisis
  3. Omphalocele
  4. Bladder extrophy
  5. Cloacal extrophy
  6. Limb body wall complex
1. UMBILICAL CORD DEFECT

Defect of the abdominal wall muscles
Skin covered
UMBILICAL CORD DEFECT

OB MUST KNOW!
or the bowel will be cut
2. GASTROSCHISIS

- Full thickness abd. wall defect
- Usually RIGHT-sided paraumbilical defect

Survival: 95% if uncomplicated
GASTROSCHISIS-COMPLICATED

- Survival decreases (~70%) if:
  - ischemia
  - perforation
  - atresia
3. OMPHALOCELE

- Herniation abd contents into base of umb cord

- Usually membrane covered
  - Peritoneum
  - Wharton’s jelly
  - Amnion

- Etiology, uncertain

- Cord insertion, at base/apex of AWD

20 wk fetus
OMPHALOCELE

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OMPHALOCELE—"TYPES"

Giant omph (>75% herniated liver)

Bowel only

with ascites
OMPHALOCELE “TYPES”

Ruptured
OMPHALOCELE “TYPES”

Ruptured

Syndromic Beckwith-Wiedemann
4. BLADDER EXSTROPHY

- Failure of ant abd wall and ant bladder wall to close normally
- AWD **INFERIOR** to the cord insertion site
- Hallmark of BE:
  - “Absent” urinary bladder
  - INFRAumbilical “mass” represents the everted bladder
  - Bladder is everted and open to the abd wall
  - Urine is released directly to amniotic cavity
- Normal amniotic fluid and hindgut
- Usually abnormal genitalia
BLADDER EXSTROPHY

29 wk fetus
BLADDER EXSTROPHY

29 wk fetus
BLADDER EXSTROPHY

29 wk fetus
5. AND A BIT MORE COMPLICATED YET CLOACAL EXSTROPHY

- AWD **INFERIOR** to the cord insertion site
- Absence of visible bladder
- Exstrophy of all structures that form the cloaca
  (rectum, bladder, lower GU tract)
- Also called OEIS:
  - omphalocele
  - Exstrophy of bladder
  - imperforate anus
  - spinal defects
A BIT OF EMBRYOLOGY

Calvo, M. Fundamental and Advanced Fetal Imaging. Ultrasound and MRI. 2015
CLOACAL EXSTROPHY

- Bowel herniates between the hemibladders ("elephant trunk")
- Separate hemibladders
- Omphalocele, cranial to complex AWD
- Anal atresia (absent anal dimple)
CLOACAL EXSTROPHY

Midline

Paramedian
ANOTHER CASE OF CLOACAL EXSTROPHY
6. LIMB BODY WALL COMPLEX

- Severe polymarformation
- Thoraco- or abdominoschisis
- Limb reduction
- Partial adherence of fetal parts to placenta
- Spinal anomalies (scoliosis)
- Short, unwound cord
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LIMB BODY WALL COMPLEX

- Uniformly lethal
- Large eccentric AWD
- Normal karyotype
- Myriad of other malformations
And now, for a CHOP special

19 wks
SUMMARY

• In the evaluation of anterior abdominal wall defects:
  
  **WATCH INSERTION OF THE CORD**

• Look for other defects

• Appropriate diagnosis have immense counseling/postnatal treatment consequences