Pediatric Hernias: When to Refer
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October 12, 2013

Disclosures
• Nothing to disclose

Outline
• Inguinal Hernias
• Epigastric Hernias
• Umbilical Hernias
• Diastasis Recti in Infancy
Blake, 2 month male

- CC: Bulge in groin
- HPI:
  - Intermittent bulge seen in left groin X 1 month
  - Seen when crying or straining
  - Disappears when at rest
  - Eating and stooling without difficulty
  - Deny noticing skin changes at anytime
- ROS: Unremarkable
- PMHx: Prematurity: 30 wks gestation, 8 wk NICU stay

Blake, 2 month male

Pediatric Inguinal Hernias
Pediatric Inguinal Hernias

• Epidemiology:
  - Incidence: range 1-5% of children
  - ~60% occur on the right side
  - Occur equally among all races¹
  - More common in males than females ratio 3-10:1²
  - Premature infants at increased risk: 16%-25%
  - Bilateral hernias present: 10%³
  - Family history: 11.5 %¹

Langman's Medical Embryology, 7th Ed 1995

Male Embryology

Atlas of Pediatric Surgery; Nakayama
**Inguinal hernias**

- Clinical presentation:
  - Intermittent bulging seen in the groin, labia, or scrotum
  - Seen with an increase in intra-abdominal pressure
  - Typically asymptomatic
    - Older children may complain of pain in groin

**Inguinal Hernia**

- Physical exam:
  - Inguinal masses or asymmetry in groin
  - Males:
    - Hold testicle in scrotum and assess for additional masses
    - Palpate spermatic cord for thickening
  - Infants: allow to strain and/or cry
  - Older children: examine supine and standing while performing Valsalva maneuver

**Silk Glove Sign**

- Single finger over the spermatic cord at the level of the pubic tubercle rubbing side-to-side
- Silk Glove sign:
  - Thickening with palpation
  - Described as rubbing two pieces of silk together
  - Not always accurate and subjective based on clinical practice!
**Inguinal Hernias**

- **Diagnostic imaging:** rarely needed:
  - Herniography: rarely used
  - US: gained popularity as an adjunct to the physical exam\(^1\)

- **Management:**
  - Surgical referral when diagnosis of inguinal hernia is made or suspected

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**Inguinal Hernias**

- **Complications:**
  - Incarceration or strangulation of intestine or omentum
  - In females: potential for incarceration or strangulation of ovary, fallopian tube, and in rare cases the uterus
  - Incidence of incarceration: 14-31%
    - 85% occur before the first year of life\(^1\)

- Incarceration and strangulation are **SURGICAL EMERGENCIES**
Strangulated Inguinal Hernias

Necrotic Loops

Tosed pedicle

Inguinal incision
Inguinal Hernia

- Surgical Complications
  - Scrotal Swelling
  - Hematoma
  - Injury to the Vas Deferens
  - Testicular atrophy
  - Recurrence
  - 3% elective repair
  - 20% incarcerated hernia repair

Contralateral Exploration

- Males with unilateral IH, surgeons performing routine contralateral exploration under 2 yrs:
  - 2005: 44%
  - 1993: 65%
- Females with unilateral IH, surgeons performing routine contralateral exploration under 4 yrs:
  - 2005: 47%
  - 1993: 84%

American Academy of Pediatrics, Section on Surgery, Hernia Survey, 2005

Laparoscopic Appearance of Right Internal Inguinal Ring

Normal

Open
Molly, 4 yr female

- CC: Bump on Abdomen
- HPI:
  - Bump present for the last 5 months
  - Increasing in size
  - Occasionally tender
  - No skin color changes
  - Eating and stooling without difficulty
- ROS: Unremarkable
- PMHX: Otherwise healthy 4 yr female

Molly, 4 yr female

Pediatric Epigastric Hernias
Epidemiology:
- Causes are multifactorial
- More common in males
- 3:1
- 20% can have multiple hernias

Clinical Presentation:
- Epigastric mass
- +/- pain

Epigastric Hernias

Epigastric Hernia

Physical Exam:
- Palpable bulge along the abdominal midline between the xiphoid process and umbilicus
- Variable in size, typically <1 cm
- Can be immediately adjacent to the umbilicus and difficulty to distinguish—careful examination is needed
- Risk of strangulation is low

Management
- Need surgical repair
- Referral to pediatric surgery once diagnosis made

Epigastric Hernia Repair
Adam, 4 yr male

- CC: Bulge in the belly button
- HPI:
  - Present since birth
  - Continues to grow with him
  - Never complains of pain
  - Eat and stool without difficulty
  - No reports of ever becoming stuck
- ROS: Unremarkable
- PMH:
  - Premature, born at 32 weeks, had 10 wk unremarkable NICU stay
  - Asthma
  - Albuterol PRN

http://hopeyscorner.com/2013/01/19/test2/

Pediatric Umbilical Hernias

http://abdomend.com/blog/hernia/abdominal-hernia/
Umbilical Hernia

- Epidemiology
  - Equal frequency in males and females
  - Increased incidence in African American infants
  - Increased incidence in premature infants
    - 75% of infants <1500 grams will spontaneously resolve
  - Less likely to close spontaneously if:
    - Larger than 1.5 cm fascial defect
    - Significant amount of protruding skin
    - Have underlying conditions: Ehlers-Danlos, Beckwith-Wiedemann syndrome, Down’s syndrome, trisomy 13, trisomy 18, mucopolysaccharidoses, hypothyroidism

Umbilical Hernia

- Fascial opening (umbilical ring) exists to allow passage of vessels from mother to the fetus
- Umbilical ring is open throughout most of gestation, but becomes progressively smaller as gestation progresses
- After birth, the umbilical ring continues to close as the fascia of the umbilical defect strengthens

Umbilical Hernia

- Clinical Presentation:
  - Typically asymptomatic
  - Seen with increased intra-abdominal pressure
  - Easily reducible
Umbilical Hernia

Management:
- UH < 1 cm
  - Observation, most will spontaneously close
  - Referral for surgical repair at 4-5 yrs if no spontaneous resolution
- UH 1.0-1.5 cm
  - Observation for decrease in fascial defect size
  - Referral for surgical repair at 4-5 yrs if no spontaneous resolution
- UH > 1.5 cm
  - Observation till at least 2 yrs of age
  - Less likely to spontaneous resolve on their own
  - Surgical referral if no spontaneous closure
- **If symptomatic or increase in size: refer sooner**

Complications:
- Incarceration or strangulation of intestine or omentum
  - Estimated to be 1:1500 hernias
  - Incarceration and strangulation are:
  - SURGICAL EMERGENCIES
Umbilical Hernia Repair

Post-operative complications:
- Recurrence
- Seroma or Hematoma
- Trapped or perforated bowel
- Bowel obstruction

Proboscoid Umbilical Hernia

- Large fascial defect and pendulous protrusion
  - Chance of spontaneous closure low
- If umbilical ring does not narrow, then recommend surgical repair during first 2 years of life
- Require surgical referral during 1st year of life
Proboscoid Umbilical Hernia

Katie, 1 month infant

- CC: Large abdominal bulge
- HPI:
  - Large bulge involving most of upper abdomen
  - Worsens when crying
  - Gone when at rest
  - Eating and stooling without difficulty
  - +gaining weight
- ROS: Unremarkable
- PMHx: Unremarkable

Katie, 1 month infant
Diastasis Recti in Infancy

- Epidemiology:
  - More common in premature infants
  - More common in African American newborns

- Clinical Presentation:
  - May appear as a “bubble” or “ridge” running down the abdomen from the xiphoid process to the umbilicus
  - More prominent with increased intra-abdominal pressure

http://www.primehealthchannel.com/diastasis-recti.html
Diastasis Recti in Infancy

- Physical Exam:
  - Edges of rectus abdominis muscles typically palpable
  - Easily seen when infant is straining or crying
  - May not be seen when lying supine and relaxed

http://newborns.stanford.edu/PhotoGallery/DiastasisRecti.html

Diastasis Recti in Infancy

- Management:
  - No diagnostic imaging needed
  - No surgical referral needed unless uncertain about diagnosis
  - Observation

Take Home Points on Pediatric Hernias

- **Inguinal Hernias:** Need early surgical referral if suspected or if diagnosed
- **Epigastric Hernias:** Need surgical referral if suspected or if diagnosed
- **Diastasis Recti in Infancy:** No surgical referral needed, observation, will resolve with time

- **Umbilical Hernias:**
  - UH <1 cm
    - Observation, most will spontaneously close
    - Referral and surgical repair ~4-5 yrs if no spontaneous resolution
  - UH 1.0-1.5 cm
    - Observation/Referral and surgical repair ~4-5 yrs if no spontaneous resolution
  - UH>1.5 cm
    - Observation till at least 2 yrs of age, less likely to resolve spontaneously, surgical referral

  **If symptomatic or increase in size: refer sooner**
References

7. Palazzi DL, Brandt, NL. Care of the umbilicus and management of umbilical disorders. In: UpToDate, Durvea TK, Garcia-Prats JA (Ed), UpToDate, Waltham, MA, 2013.

Thank you

- Ravindra Vegunta MD, FRCSEd, FACS, FAAP
- Joseph Janik MD, FACS, FAAP