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Pediatric Abdominal Pain – Children

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* *Drug doses are a guide only, always check second source and follow local practice guidelines*

Summary Pearls:

- A-B-Cs
- Rule out surgical abdomen
- Look in the diaper!
- Biliary emesis is a surgical emergency until proven otherwise
- Do not delay consulting a pediatric surgeon in any patient with biliary emesis, peritonitis or appears unstable due to a surgical abdomen.
- Have a low threshold for admission for serial abdominal checks &/or MRI to reduce risk of radiation when possible.

Introduction

As with the elderly, children with abdominal pain are special and require a different diagnostic approach. In this episode of C3, we will consider the general approach to abdominal pain in children. GI emergencies in infants, who are usually unable to express the chief complaint of abdominal pain and can rapidly decompensate, will be considered in a future episode. As children move into the older school age range, their presentations and pathologies become more similar to adults. Therefore, this episode's focus is on 6 mos children from toddlers to the pre-teen age (<10yrs).

INITIAL APPROACH:

Obtaining a reliable H&P in pediatrics is a challenge in it of itself. Data gathering has never been more important with this young patient population who cannot articulate well for themselves. The history can often be subjective based on the source, and thus your approach to the H&P needs to be a multifaceted data gathering approach.

Even upon walking into the room to obtain your history, you need to start your visual assessment of that child's **GENERAL APPEARANCE**. This is as simple as observing the baby/child on moms lap or on the gurney.

In the first few moments in the room, as you introduce yourself, you should be asking yourself:

- **Is this an H&P patient?**
 - Do they look like a million bucks, playful and eating a cracker? Are they running around the room pulling out cotton swabs out of drawers?
 - In which case you can relax, take a few minutes to dig deeper and ask the parent many more specific details?
- **Or is this an ABC resuscitation patient?** Are they listless, "star-fished" out on the gurney? Are they ill appearing, toxic or lethargic?
 - If so, history gathering will have to simultaneously concur with immediate intervention as in any unstable patient.
 - What are their vital signs?
 - Go directly to "intervention" while obtaining the rest of the history.

IF LETHARGIC/LISTLESS/Peritoneal, INITIATE THE FOLLOWING:

Call surgeon early in resuscitation

1. IV access (IO/scalp line/US guided/vein illuminator)
2. O₂, monitor
3. NPO
4. POC glucose
5. Airway
6. Fluids
 - a. Mild/ moderate/ severe dehydration clinically (# wet diapers, UOP, oral mucosa, sunken fontanelle, tears)
 - b. 20-30 cc/kg initial bolus then reassess (hand push if needed)
7. Pain control

8. Labs/UA/Cultures/Utox
9. Obtain cultures and start empiric antibiotics
10. GET THAT SURGEON TO BEDSIDE
11. Imaging: A negative imaging study does not rule out any of the above diagnoses. Do not delay obtaining surgical consult for imaging.
 - a. Plain radiographs - free air, air-fluid levels, masses, paucity of gas in distal segments
 - b. US - operator dependent, patient compliance can be challenging
 - c. CT - high radiation, consider together with surgeon
 - d. MRI - if patient is stable and can be performed easily without sedation

HISTORY:

When children are young and largely non-verbal, the history will largely be subjective, fueled by parental/caregiver concern. Heeding parental concern is important but you are also looking for objective red flags that support their concerns. As children get older (school age) their histories will become more reliable. However realize that children (based on their age) may also want to appease you or their parents. So their history is also relatively subjective.

Because of this subjectivity, even as you begin obtaining your history (with details below), When obtaining a history from the parent/caregiver, it is first prudent to know WHO is offering this information? Is the information directly from the primary caregiver? Or is mom at work and grandma is the caregiver, but mom is relaying the information after work? Ideally data and hx from primary caregiver is best.

HPI:

- **Length of Time of SXS**
 - Acute vs Chronic process (Management may differ)
- **Description, Location, Timing and Frequency of Pain**
 - Colicky and Cyclical?
 - Constant? Intermittent?
 - Associated with food? Urination? Diarrhea? Stooling? Other
 - Localized vs Generalized
- **Level of Activity**
 - Subjective
 - Parents /Caregivers perception from "normal" is distressing to them but kid could look nontoxic and well.

• Associated Symptoms:

- **Fever:**
 - # Days of fever (FUO @ day 1 vs. day 5)
 - Height of fever
 - Timing of fever may increase suspicion for 2ndary infection
 - Hx of febrile seizure?
- **Vomiting:** Vomiting in children is very common. It can be from benign causes (reflux, overfed, post-tussive etc). But we first need to first rule out emergent pathologic causes.
 - Color of emesis
 - **Bilious emesis is a surgical abdomen until proven otherwise.**
 - Coffee ground emesis can also be concerning for gastric irritation
 - Most common and less pathologic is clear, white, yellow gastric contents.
 - # Of episodes
 - Gives you an idea of amount of volume depletion
 - Intractable (benign etiology, but dehydrated warrants admission)
 - Is the child able to eat?
 - Even small volume of fluids in between?
 - Timing
 - Vomiting unprovoked or associated with coughing (post-tussive?) or post head injury?
- **Consider Non-GI Causes of Vomiting**
 - Central (intracranial hemorrhage, meningitis, mass)
 - Referred causes from the GU system
 - Could this be an initial presentation for a rare metabolic or endocrine disorder.
 - Hx of trauma (blunt head injury vs. blunt abdominal trauma?)
 - NAT
 - Exposure/possible access to foreign bodies or toxicologic agents?
 - Prescription medications, chemicals in the home, foreign bodies.
 - Do they get cared for outside the home? If so with whom?
- **Diarrhea:** is relatively nonspecific and can be associated with many etiologies

- # Episodes daily (volume status)
- Infectious red flags
- Bloody
- A word on management in children compared to adults (no empiric antibiotics in kids. Wait for Cx.)
- **Hydration status**
 - # Diapers/UOP/BM vs. input
 - Intake vs. output
- **DIET:**
 - Breast vs. bottle
 - Solid vs liquid only
 - # oz intake vs. loss

PMHx:

- **Birth history** - Prematurity? If so, how many weeks premature?
 - What is their corrected age? Why this is imp^t*
- **Other Medical history:**
 - Hx of UTI, VP shunt, febrile seizure

PSurgHx:

- Abdominal surgeries
 - A child with any previous abdominal surgery should be considered a higher risk patient for obstructive complications.
 - Seeing abdominal scars should prompt an immediate questioning for further history.
 - Hx of circumcision (UTI in male)

Social hx:

- Living situation/ DayCare situation
- Sick Contacts
 - Siblings/family contacts
 - Daycare
 - Travel
- Smoking/drugs/etoh in home

PHYSICAL EXAM:

Infant-toddler: In general it is best to perform the abdominal exam while the child is calm and comfortable (in mom's lap, or held by caregiver) and done while distracting the child. And certainly before you start upsetting them by looking in the ears/ throat etc.

Older school age: distraction is key. Talk to them about school, their favorite class, sport or friend. While distracting them feel for signs of a surgical abdomen.

1. Red flags on PE
 - Lethargy/Listlessness in their general appearance
 - Inconsolable crying
 - Peritoneal signs or abdominal distension
 - Intractable vomiting
 - Bulging or sunken fontanelle in an infant
 - Nuchal rigidity, photophobia, petechiae in any age
 - Patterns of injury that are inconsistent with history
2. TAKE DOWN THE DIAPER or look in the underwear.
 - Examining the GU area should be considered part of the abdominal exam, to evaluate for important surgical pathologic causes such as incarcerated hernia, masses, and non-accidental trauma.
 - Include mom/dad in this process in child is older.
3. Other systemic contributors to possible referred pain
 - Strep pharyngitis (preschool and older) often causes vague abdominal pain
 - Henoch-Schönlein purpura (HSP)

ABDOMEN RULE OUT IMMEDIATE LIFE THREATENING CAUSES

- **Malrotation with volvulus:** Malrotation is where the cecum is tethered to the peritoneum, twists on its mesentery leading to malrotation, obstruction and ischemia. Although 60% will present by 1 month of age, many will not present till age 1yr, and 25% can present up to age 5.
 - **Hx:** Sudden onset of bilious vomiting, peritonitis. Dx: This is truly a surgical emergency and should be promptly evaluated by a pediatric surgeon.
 - **Dx:**
 - Upper GI series: is study of choice only if the pt is stable
 - KUB: may show a "double-bubble sign," most often non-specific or normal
 - US: often non-diagnostic
 - **Rx: Surgery**
- **Intussusception**

- One of the most common abdominal emergencies in early childhood. Typically from 2 mos - 2 years.
- Invagination or telescoping of a part of the intestine into itself, most often occurring at the ileocecal junction, but can happen anywhere along the bowel. When the bowel telescopes in on itself, it drags along with it part of the mesentery, which this leads to intestinal edema → ischemia, perforation, and peritonitis.
- **Hx:** Sudden onset of severe colicky abdominal pain that is cyclical in nature associated with inconsolable crying and drawing up of the legs towards the belly. Episodes typically last 15-20 minutes then recur. In between the child can look completely asymptomatic. Initially, emesis is non-bilious, but it may become bilious as the obstruction progresses.
- **Dx:**
 - US: classic ultrasound image of the “target sign” (aka: “bull’s eye”)
 - KUB: may show mass, but non diagnostic
- **Rx:** If patient is stable, can attempt reduction by either hydrostatic (saline or barium contrast) enema or pneumatic (air) enema; if unstable or reduction by enema fails, proceed to OR.
- **Note:** May occur with Henoch-Schönlein purpura (HSP)
- **Hirschsprung disease with Acute Obstruction**
 - Congenital disease where ganglionic cells of the gut fail to migrate properly to the colon resulting in an aganglionic segment of the colon. Often diagnosed in the newborn nursery when babies don’t pass their first meconium. If the diagnosis is missed, infants may present delayed with bilious emesis, abdominal distension, and signs of DISTAL intestinal obstruction (i.e.: In most severe states young infants can present with enterocolitis (fever, vomiting, diarrhea, and abdominal distension), which can progress to toxic megacolon.
 - If the child has any signs of peritonitis, bilious emesis, or unstable vital signs, involving a pediatric surgeon early on in the course is prudent. Do not allow imaging, or workup to delay obtaining consult.
 - **Dx:**
 - Rectal biopsy is considered the gold standard for diagnosis.
 - Contrast (barium) enema or anorectal manometry
 - KUB: may show an absence of air in the rectum with dilated loops of bowel proximal to the aganglionic region. A negative KUB does not exclude the dx.
- **Severe Blunt Abdominal Trauma (Nonaccidental)**
 - Always consider nonaccidental trauma
 - Blunt abdominal trauma can lead to serious surgical concerns (ruptured spleen, liver lacerations, bowel contusion etc).
 - History is key here, and clinical suspicion should be taken very seriously.
 - CT of abdomen best to identify injury patterns
 - Follow trauma algorithm
 - Have a low threshold to admit patients for observation if you are concerned about NAT or want to perform serial abdominal exams due to concerns of a developing surgical abdomen.
- **Adhesions with obstruction/perforation**
 - Previous abdominal surgeries predispose patients to developing adhesions with increased risk for bowel obstruction. Patients may present with abdominal distension, intractable vomiting and inability to tolerate orals.
 - **Dx:**
 - KUB: may show air fluid levels, free air under diaphragm if perforated
- **Appendicitis**
 - Appendicitis is one of the most common nontraumatic surgical emergencies in children. Diagnosed in up to 8% of children who present acutely with abdominal pain.
 - Infants: In young neonates and infants it is rare and often missed, until they have perforated and developed sepsis.
 - Age 2-5 years: present with nonspecific symptoms: fever, vomiting, abdominal pain. <50 % will actually have RLQ pain.
 - Age 5-12 years: anorexia, vomiting, peritoneal sxs, ~80% +McBurney’s sign
 - **Dx:** US is still test of choice
 - MRI is next choice
- **Incarcerated Hernia**
 - Umbilical, ventral, inguinal hernias
 - Importance of diaper/GU exam
- **Gonadal Torsion**
 - Premenarchal girls and prepubertal boys can develop torsion of the gonads.
 - Difficult diagnosis to make, especially in females.
 - Consider in boys with undescended testes
- **Cholecystitis/Pancreatitis**
 - Rare in kids
 - If present often have predisposing conditions such as hemoglobinopathies or cystic fibrosis

- Foreign body
 - FB ingestion is a GI problem that is unique to small children.
 - Keeping small objects out of reach for an age group that learns by putting everything in their mouth is a recipe for disaster.
 - Rare Earth Magnets, Toxins, Sharp FBs are particular concern.

CONSIDER EMERGENT MEDICAL CAUSES

- DKA
- Pneumonia
- Asthma
- Toxic ingestion
- Metabolic disorders

STEP THREE: CONSIDER BENIGN/MORE COMMON CAUSES:

If the child you are examining is stable, well appearing, has a benign abdomen and you are not concerned about an emergent cause, consider the more common causes of pediatric abdominal pain.

- Constipation
 - One of the leading causes of abdominal pain in children
 - Dx: < 2 BM's/week, straining w BM, painful hard stools, large fecal mass in rectum, +/- encopresis after potty training, no pathologic cause
 - Functional constipation should be a dx of exclusion
 - Consider Hirschsprung's in children with delayed passage of meconium in newborn nursery > 48 hours
 - Greatest incidence: transition to cow's milk, potty training, transitions in diet, age related school stress all factor in
 - Tx: In ED if tx needed, glycerin suppository is safest. Avoid fleets/soap suds enemas. Home tx: Increase water, fruit/vegetable/fiber ingestion; osmotic laxatives (ie: polyethylene glycol 3350 - miralax), and follow up with PCP.
- Viral gastroenteritis
 - Hydration status still imp't here
 - Hco3 level
- Referred pain
 - Uti
 - Pneumonia
 - Asthma (costal retractions)
 - Strep pharyngitis

- Head injury
- Non-accidental trauma
- HSP
- Back pain
- Stress
- Sexual abuse

Disposition:

If initial ED workup is unrevealing, however the pt continues to have concerning sx's, have a low threshold to admit patients for observation if you are concerned. want to perform serial abdominal exams due to concerns of a developing surgical abdomen, all of these are good reasons to admit.

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