Abdominal Pain in Children

- Acute abdominal pain is a common chief complaint in pediatrics (~5-10% ED visits).
- Nontraumatic origin of pain, maximum duration 5 days, symptoms range from mild/self-limiting – life-threatening diseases.
- Infrequently (less than 2%) patients with abdominal pain have potentially devastating consequences.
- Repetitive diagnostic tests lead to increased anxiety, increased healthcare costs.
- A stepwise approach required.


Case 1: Maribel

- 15-year-old female with 3-day history of abdominal pain and vomiting and occasional loose stools.
- HPI:
  - Nauseated anytime she tries to eat or drink.
  - She has diffuse abdominal pain she points to her entire abdomen when asked where it hurts, with persistent questioning she says, “mostly in the upper area.” Pain is reported as worse with eating, walking or lying flat.
  - Emesis, “orange liquid with chunks in it.”
  - The patient reports drinking 2 cups (~226 g) of hand sanitizer each day (she sneaks this when no one is looking in gym class).
  - She is currently in a residential treatment program for depression and suicidal ideation.

Kyper (2020)
Case 2: Bruno

- 18-month-old male presents to the ED with irritability, suspected abdominal pain and lethargy

HPI:
- Irritability, non-bloody diarrhea and lethargy x 4 hours
- Mother reports that pain is intermittent “He will play in between episodes” Each episode lasts 15-20 minutes, followed by fatigue
- Decreased PO intake and lethargy over the past 12 hours, Emesis (non-bilious x1 this AM) last wet diaper 12 hours ago
- Mother reports URI 1 week ago with low grade fever but this has resolved.
- 4-year-old sister is sick at present with symptoms of a cold. Bruno goes to daycare, no recent travel.

Pech (2020)

Case 3: Antonio

- 5-year-old male presented to the clinic for a constipation

Chief complaint of abdominal pain and persistent constipation that began 1.0−1.5 years ago.

HPI:
- Stooling pattern was described as 1−3 painful stools per day with a consistency of small pebbles to pebble stool clumps (Bristol categories 1 and 2).
- Blood streaks on the outside of the stool 2−3 times per week, but no blood within the stool.
- One regular toileting after school and would attempt to eliminate three times before successful elimination.
- Aching pain in the periumbilical region daily.
- Parents report abdominal pain that seemed to vary in intensity and was not relieved by stool elimination. Denied encopresis, enuresis, nausea, vomiting, and gastrointestinal reflux symptoms.
- Ate 3 meals and 1 snacks per day; variety of foods.
- Parents reduced dairy to one serving per day but saw no difference in abdominal pain or stool consistency.
- He complained of abdominal pain with drinks other than water.

Casias (2021)

Principal Causes of Acute Abdominal Pain in Children

1. Appendicitis
2. Intussusception
3. Cholecystitis
4. Pancreatitis
5. Malrotation / Volvulus
6. Constipation

Appendicitis

- Most common abdominal surgical emergency in childhood
- Uncommon < 5 years old
- Alvarado and Pediatric Appendicitis Score—scoring systems
- CT scan most accurate diagnostic modality
- WBC count + CRP =94% specificity
- Definitive treatment -Surgery

Baker (2018)

Intussusception

- Invagination of proximal segment of bowel into the distal segment
- Classic Triad:
- Severe abdominal pain
- Sausage shaped abdominal mass
- Currant jelly stools
- 6-36 months most common presentation, recurrent episodes normal
- Ultrasonography diagnostic test of choice – specificity close to 100%
- Nonsurgical techniques for reduction attempt x 3
- Unstable patient -surgery

Baker (2018)

Cholecystitis

- Predisposition:
  - TPN
  - Hemolytic diseases
  - Systemic infections
  - Some antibiotics
  - Biliary anatomical anomalies
  - CF
  - Elevated estrogren
  - Positive family hx
  - Obesity
- Increase in frequency and treatment – awareness / obesity
- Work up: WBC, inflammatory markers, LFTs
- Abdominal US diagnostic test of choice >90% accuracy-HIDA scan equal accuracy
- Management – age based
  - Neonates-monitor
  - Older symptomatic children – Cholecystectomy
  - Acute Cholecystitis, + Murphy sign
    - Hospitalization, management then laparoscopic removal

Baker (2018)
Pancreatitis

- 13.2 cases / 100,000 children in the U.S.
- Children – 1/3 of cases with unknown etiology

Diagnosis
- Clinical findings: acute abdominal (epigastric)/back pain, nausea/vomiting
- Labs: amylase or lipase >3 times upper limit level
- Imaging consistent with diagnosis US/CT scan

Treatment:
- Pain management
- Fluid management
- Nutrition

Baker (2018)

Malrotation / Volvulus

- Midgut volvulus is a surgical emergency (~45% occurs with malrotation)
- Malrotation is failure of normal rotation and fixation during development. (Intermittent pain with intermittent obstruction)
- Diagnosis = high level of suspicion.
  - Most consistent symptom is bilious/non-bilious vomiting
  - Upper GI series imaging of choice – 96% sensitive.
  - Management = Surgery as soon as possible

Baker (2018)

Constipation

- Most frequent identified cause of acute abdominal pain
- Not a medical emergency but can present as such
- Careful history = KEY!
- Issues with defecation
- Infrequent stools
- Large, pebbly stools
- Painful stool +/- withholding behavior
- Exam:
  - Multiple fecal masses palpated through the abdominal wall, sometimes single large mass in the suprapubic area
  - DRE: hard stool in the rectal vault
  - Pain poorly localized, typically non-radiating
- Workup: CBC, CRP, electrolytes will be normal.

Baker (2018)

Constipation Diagnosis: Rome IV Criteria

Diagnostic Criteria for Functional Constipation:
- Must include 1 month of at least 2 of the following in infants up to 4 years of age:
  1. 2 or fewer defecations per week
  2. History of excessive stool retention
  3. History of painful or hard bowel movements
  4. History of large-diameter stools
  5. Presence of a large fecal mass in the rectum

In toilet-trained children, the following additional criteria may be used:
- At least 1 episode/week of incontinence after the acquisition of toileting skills
- History of large-diameter stools that may obstruct the toilet

Casias (2021)

Etiologies of Constipation

Baker (2018)
Case 1: Maribel

- PMHx: Type 2 DM, depression, suicidal ideation, self-mutilation, obesity and bulimia. Alcohol and marijuana use reported since the age of 12 years.
- Medications: aripiprazole, MiraLAX, fluoxetine, quetiapine, escitalopram, olanzapine, metformin, Colace, falcidilone, potassium supps, omega-3, Vit B complex, Vit C, ferrous sulfate & diphenhydramine.
- Surgical Hx: Tonsillectomy and adenoidectomy at age 7.
- Family Hx: Both parents are healthy, Maternal grandfather with history of depression and anxiety.

Kyper (2020)

Case 1: Mirabel

- Current Status:
  - Vitals: 38.4 C / 101.2, HR 112, RR 20, BP 151/87, O2 sat 95% on room air. Weight 122 kg
  - Labs: remarkable for: WBC 16, Amylase 191, Lipase 236
  - Imaging: gallbladder wall thickening. Positive perimobile Murphy’s sign. Visualized portions of the pancreas within normal limits
  - CT scan: pancreas is diffusely is edematous with surrounding peripancreatic fat stranding and fluid. No pseudocyst. Mild abdominal ascites, no calcifications in the gallbladder or biliary tree. Bilateral small pleural effusions noted.

ANSWER GARDEN

Kyper (2020)

Case 2: Bruno

- PMHx:
  - Term, uncomplicated vaginal delivery
  - Mother had prenatal care initiated at 10 weeks. Mother tested negative for STI, HIV, rubella and Group B-Strep
  - Hyperbilirubinemia – required phototherapy at discharge (DC home @ 3 days old)
  - Growth and development targeted (50% for weight, 60% height, 85% head circ)
- Medications:
  - Has received all Immunizations for age including MMR, 1st varicella, 1st and 2nd influenza vaccines
- Surgical Hx:
  - Uncomplicated circumcision 1st day of life
- Family Hx:
  - Mother has migraine headaches
  - Father with elevated cholesterol
  - Maternal Granma treated breast cancer / remission, Grandfather HTN, DM Type 2, coronary artery disease/stent placement.

Pech (2020)

Case 2: Bruno

- Current Status:
  - Vitals: Temp 38.5 c, (101.3 f), HR 124, RR 28, BP 96/48
  - Exam: Awake & alert, comfortable. Mild diffuse abdominal tenderness with palpation
- Labs: WBC 13, HGB 11.8, HCT 33, PLT 306, NA 140, K 3.6, CL 95, CO2 20, BUN 12, Cr 0.5, Gluc. 82, CA 9.8.
- Imaging:
  - Abdominal US: Obstruction and moderate stool burden.
  - Imaging you note - target sign superior to umbilicus, no lead point or free fluid.

ANSWER GARDEN

Pech (2020)

Case 3: Antonio

- PMHx:
  - Received suppositories while admitted to the hospital at age 4 years old for a femur fracture. He was prescribed senna suppositories and polyethylene glycol (PEG) 3350 at discharge from the hospital
  - Bowel clean-out x 3 at home over the past year with minimal success
  - His most recent cleanout was 1 month earlier with five capfuls (85 g) of PEG 3350 daily for 3 days with loose stool results.
  - Sennosides and PEG 3350 were administered when he was unable to have a daily bowel movement
- Medications:
  - Has received all Immunizations
- Surgical Hx:
  - Femur Fracture S/P repair
- Family Hx:
  - Mother and Maternal Grandmother - Constipation

Casias (2021)

Case 3: Antonio

- Current Status:
  - Child was well-appearing, alert, interactive, and cooperative during the examination.
  - Oral examination revealed no lesions, ulcerations, or masses.
  - Normal bowel sounds were present in all quadrants.
  - Abdominal palpation revealed no tenderness, masses, palpable stool, or organomegaly.
  - Patellar deep tendon reflexes were checked to look for spinal cord abnormalities and were present bilaterally.
- Imaging:
  - Two abdominal x-rays were obtained at 11 and 12-months before the appointment, which indicated moderate to severe colonic stool burden
  - An abdominal x-ray was obtained at the appointment, which showed an elongated colon with proximal and distal colonic stool build-up

ANSWER GARDEN

Casias (2021)
Diagnostic Testing

1. Abdominal X-ray
2. Ultrasound
3. HIDA Scan
4. CT Scan
5. MRI

Baker (2018)

Treatment Options

1. Monitoring
2. Medications
3. Surgical Interventions

Warning Signs: Disease vs Functional Abdominal Pain

POSSIBLE surgery
- Absent bowel sounds
- Bloody vomiting
- Bloody diarrhea/ occult blood in stool
- Elevated Temp > 100.4 f
- Rebound tenderness.
- Rigidity/ involuntary guarding
- Voluntary guarding
- Acute, severe pain, more localized
- Increasing intensity of pain
- Pain precedes emesis
- Hematochezia

Non-surgical
- Mild, generalized pain
- Stable pain intensity
- Vomiting absent or precedes pain onset
- Long duration of pain
- Nondistended abdomen
- Diffuse tenderness
- No rigidity or rebound tenderness

Hijaz (2017), Reust (2016)

COVID-19 Impact

- The first severe case of childhood infection started with gastrointestinal symptoms
- Clinical manifestations:
  - Most common symptoms: cough / fever
  - Fatigue
  - Myalgia
  - Nasal congestion
  - Runny nose, sneezing, sore throat
  - Headache
  - Diarrhea
  - Vomiting
  - Abdominal pain
- A few children do not exhibit fever, but only manifest cough or diarrhea
- Fewer can be asymptomatic carriers.

She (2020)

Organized Thought Process / Approach

References

