Overview of GI Disorders in Children

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Disclosure

• I have no actual or potential conflict of interest in relation to this presentation.
• I will discuss programs and services in which I have no financial interest.
Educational Objectives

• Classify functional gastrointestinal (GI) disorders that are associated with abdominal pain.
• Rule out organic causes of abdominal pain based on history, physical examination, and laboratory testing.
• Incorporate stress management – coping and relaxation into the treatment plan.
• Understand Celiac disease and Eosinophilic Esophagitis
• Recognize the red flags of Inflammatory Bowel Disease
• Recommend the most appropriate treatment options for constipation.
• Understand how to work up gastroenteritis and assess for dehydration
• Recognize appendicitis in differential for abdominal pain
• Evaluate for ge reflux and treatment options
GI Anatomy

- liver
- gallbladder
- duodenum
- ascending colon
- ileum
- cecum
- appendix
- stomach
- pancreas
- transverse colon
- descending colon
- jejunum
- sigmoid colon
Definitions

• Chronic Abd Pain- intermittent or continuous pain for >1mo
• Recurrent Abd Pain > 3 episodes of pain over 3 months, functional or organic
• Functional Abd Pain- abd pain that cannot be explained by any visible or detectable abnormality
• Organic abd pain – anatomic abnormality or detectable disease based on lab, image or bx
Functional Abdominal Pain (FAP)

- Episodic or continuous pain >1 wk for >2 mo without demonstrable disease.
- 10%-20% of school age children have FAP
Classification of FAP

• **Irritable Bowel Syndrome**- associated with diarrhea or constipation
• **Functional dyspepsia**- associated with nausea, burning and epigastric pain but no disease
• **Abdominal migraine**- paroxysmal episodes of severe pain with anorexia, nausea, headache, photophobia, and pallor
Abd Pain History

• When did it start- duration of onset ?
• Where does it hurt- location ?
• What does it feel like – description?
• What makes it better or worse- triggers?
• Associated with meals or eating?
• How much does it hurt- severity?
• Does it improve after bowel movement?
• What have you tried so far- treatments?
Abd pain hx continued

• Comes and goes or all the time- continuous or intermittent?
• Menstrual history, pregnancy?
• Affect sleep, play or activities?
• Stressors at home, school or with friends. Changes- divorce, move, custody issues?
• Ask child what he/she thinks pain is from?
Diagnostic Evaluation

• Thorough history, careful psychosocial hx
• Any pattern? Get pain log?
• Labs- CBC/diff, CMP, Sed, CRP, Celiac, amylase, lipase
• Stool studies- Cx, O & P, occult blood, fecal lactoferrin, H. Pylori stool Ag
• Lactose Hydrogen Breath test- evaluate for lactose intolerance vs small intestinal bacterial overgrowth.
Abdominal pain?
Bloating?
Diarrhea?
Constipation?
Hydrogen Breath Test
+ Hydrogen Breath Test
Typical FAP Symptoms

- Poorly localized pain, periumbilical
- Short duration 1-3 hrs
- Sleeps well
- Not interfering with play
- Associated with other somatic complaints
- Poor diet, low in fiber
- Stressors at home, school or with peers
Increased Organic Disease Assoc

- Localized pain
- Pain awakens at night
- Interferes with play or activities
- Poor wt gain, or growth failure
- Intermittent unexplained fevers
- Stools with blood or mucus
- Abdominal distention
- + family hx of IBD, Celiac or Peptic Ulcer disease
Treatment of FAP

- Focus on healthy nutrition, dietician consult
- High fiber diet, drink plenty of liquids
- Treat constipation, goal is soft daily BM
- Regular aerobic exercise, less screen time
- Good sleep hygiene, 8 hrs/night
- Stress mgmt, Psychologist- coping/relaxaton, biofeedback, yoga, imagery, mindfulness meditation, acupuncture
Medications often trialed

- Levsin (Hyosyamine) for abd cramps
- Miralax (Polyethylene Glycol) for constipation
- Dulcolax (Bisacodyl) if no BM in 2 days
- Gaviscon, Maalox, Mylanta
- H2 Blockers- Zantac (Ranitidine), Pepcid (Famotidine)
- PPI- Prilosec (Omeprazole), Prevacid (Lansoprazole)
- Periactin (Cyproheptadine) for abd migraine
Imaging

- KUB
- Abd Ultrasound
- UGI
- UGI/SBFT
- HIDA
- Gastric emptying scan
- MRE
- MR of Abd/Pelvis
Ovarian Cyst
Ovarian Cyst

LT OV CYST
+ 4.63 cm
X 4.35 cm.
Malrotation - UGI
Cyclic Vomiting Syndrome

- Recurrent bouts of explosive vomiting and/or abd pain
- At least 3 attacks in 6 mo
- N/V – duration 1 hr to 10 days
- Vomit at least x4/hr for 1 hour
- Completely healthy between episodes
- Often assoc with migraine type headache
- Tx- Periactin or Amitriptyline
Celiac Disease

• Immune response to gluten in genetically predisposed individuals
• Small bowel mucosal inflammation resulting in villous atrophy
• Incidence- 1 in 133 Americans, 3 million in US
• Higher incidence with other immune disorders, Type I diabetes, Down’s Syndrome, thyroid disease
Symptoms of Celiac Disease

• Abd pain/cramps
• Bloat, distention, indigestion
• Diarrhea/constipation
• Anorexia, fatigue, headaches
• Anemia, osteoporosis, Vit deficiencies
• Skin rash-dermatitis herpetiformis
• Delayed puberty, short stature
• Wt loss
Diagnosis of Celiac Disease

- Celiac Serology- IGA, TTG/IGA
- If IGA deficiency get TTG/IGG
- Endomyseal antibody is an alternative
- Stay on regular diet until biopsy of duodenum
- Upper Endoscopy, EGD is the gold standard for diagnosis
• Malabsorption with distention
Biopsy images

Normal

Celiac Disease
Treatment of Celiac Disease

• Life long adherence to Gluten free diet
• Avoid wheat, rye and barley
• Dietician consult, Celiac support group
Gluten free diet

• Support family with good tasting gluten free foods.
Inflammatory Bowel Disease

• Crohn’s disease and Ulcerative Colitis are the two main forms of IBD.
• One or more areas or the intestinal tract are inflamed.
• Crohn’s can affect any region of the GI tract- mouth to anus, the most common area is the last part of the small intestine (terminal ileum).
• Ulcerative Colitis is disease of the colon- large intestine
Poor Growth
Growth Failure
Poor Weight Gain
Symptoms of IBD

• Bloody stool, + mucus
• Diarrhea
• Growth failure
• Delayed puberty
• Joint pain, arthritis, ocular involvement
• Skin lesions, erythema nodosum
• Abd pain
• Oral ulcers, perianal disease
• Unexplained fevers
Erythema Nodosum
Erythema Nodosum
Work up with IBD

- Anemia, thrombocytosis- high platlets
- Elevated inflammatory markers
- Low albumin
- MRE-thickening/narrowing of bowel wall
- EGD/Colon – gold standard for biopsy
IBD
Treatment of IBD

- Medications: Prednisone, Mesalamines, immune Modulators, Biologics, MVT
- Healthy nutrition
- Encourage healthy lifestyle: sleep, exercise, stress mgmt
- School support: unrestricted access to the restroom, nutritional support with cafeteria
Intussusception

• Medical emergency-intestinal blockage
• “Telescoping”- slide of intestine into adjacent intestine
• More common 6 mo-3 yrs
• Abd pain, distention, listless, shock
• Bloody “current jelly stool”- mucus
• If untreated blood supply cut off, tissue death, perforation of intestinal wall, peritonitis
• Dx –Abd US, Tx- Contrast Enema, stabilize, antibiotics?, surgery
Intussusception
Intussusception – current jelly stool
GE Reflux

- Regurgitation, vomiting, burning
- Sour taste
- Increased when reclined after eating
- Dysphagia, feeding refusal
- Food triggers- acidic, spicy, greasy
- Epigastric pain
- Poor gain in infants, irritability
- Asthma trigger in some, recurrent PN
Causes of GE Reflux

• Immature LES in infants- typically improves by 7-8 months
• Milk/soy protein intolerance
• Delayed gastric emptying
• Pyloric Stenosis
• Increased incidence in premature infants and child with hypotonia/developmental delay
GE reflux - Diagnosis

- UGI- evaluates anatomy/pyloric stenosis
- Gastric Scintiscan- gastric emptying scan, add 24 hr delayed image to evaluate for aspiration
- Pharyngogram- evaluate swallowing with video fluoroscopy and speech path. Use various textures, aspiration?
- Impedance Probe- evaluate for acid/nonacidic
- H. pylori stool Ag
Gastric Emptying Scan

Scrambled Eggs
Impedance Probe
Impedance probe
Ph probe
Pharyngogram
Haryngogram
Pharyngogram
EGD
EGD Ulcer
H Pylori
H Pylori Cobblestoning
H Pylori Infections

Helicobacter pylori Infections

Asymptomatic
Chronic atrophic gastritis
Gastric or Fundal ulcers
Gastric cancer
GE Reflux Treatment

• Formula change- Nutramigen/Alimentum or if more severe Elemental Neocate/Elecare formula
• Focus on healthy nutrition- gerd precautions
• Weight mgmt
• Acid suppression- H2 Blockers- Ranitidine, Famotidine, PPI- Omeprazole, Lansoprazole
• Often try to wean medications gradually over the Summer
Medications

- Infants – Gaviscon, Maalox, or Mylanta- give intermittently or before feed
- H2 Blockers- Zantac, Pepcid- give 20 min before feed
- PPI- Omeprazole, Prevacid
- Prokinetic Agents- EES, Reglan, for delayed gastric emptying
- Carafate- surface agent, adheres to ulcer site
Eosinophilic Esophagitis

• Inflammatory allergic condition in which the wall of the esophagus becomes filled with large number of allergic cells- eosinophils.

• Symptoms include dysphagia, nausea, feeding disorders, prolonged meal time, regurgitation, food getting stuck or impacted due to narrowing of the esophagus.

• Atopic children are at risk- those with asthma, environmental allergies, and eczema.
EoE

- Increased symptoms in Springtime
- Males > females
- Increased with food allergies
Dx and Treatment of EoE

- EGD with biopsy
- Budesonide or Flovent - SWALLOWED
- PPI
- Allergist consult- identify food allergy?
- Diet elimination if known trigger
- Eat slowly, chew food well, increased liquids
- Surveillance endoscopy
Constipation

• Consider Celiac, thyroid screen
• Start with bowel cleanout for chronic constipation- Miralax 17 gr/8 oz liquid hourly x6 hrs. Consider Dulcolax 5mg tab at onset and repeat in 3 hrs. Repeat in 1 day if needed
• Maintenance Miralax- 17 gr x1-2/day, adjust as needed
• Dulcolax tab if no BM in 2 days or Dulcolax 10 mg Supp before dinner with time on toilet after dinner
• High fiber diet- whole grains, plenty of liquids
• Decrease cow’s milk products
• Time on toilet after meals
Constipation

- Involve school nurse
- Routine aerobic exercise
- Get plenty of liquids
- Fiber supplements- Benefiber, Metamucil
- Support to avoid stool holding
- Counseling may be needed for behavioral mgmt
Encopresis

• Stool holding or soiling, occurs when your child resists having bowel movements, causing impacted stool to collect in the colon and rectum. When your child's colon is full of impacted stool, liquid stool can leak around the impacted stool and out of the anus, staining your child's underwear.

• Treat with aggressive constipation mgmt, toilet sit times after meals, may need to involve psychologist for behavioral mgmt.
Hirschsprung’s disease - Barium enema - UNPREPPED
Hirschsprung’s Disease
Rectal Suction Biopsy
Hirschsprung’s disease
Gastroenteritis/Diarrhea

- Onset, frequency, appearance, blood, mucus, wt loss/growth, fever, abd pain, acute/chronic, perianal disease, nutritional status, antibiotic hx, meds, nocturnal symptoms, travel, exposures, ill contacts, exotic pets, food/water contamination, associated symptoms, vomiting
Osmotic Diarrhea

- Lactose intolerance, excessive juice intake, sorbitol
- Watery stool, bloat, gas
- Non-digestible sugars
- Improves with fasting
- Examples-Miralax, lactulose
Secretory Diarrhea

- Traveler's diarrhea, E.coli, bacterial toxins
- Caused by derangement in mechanisms regulating fluid/electrolyte movement
- High volume, watery stool, persists with fasting
- Increased secretion, decreased absorption
Motility

- Decreased transit time
- Worse after eating
- Decreases the ability of the colon to absorb water
- Irritable bowel, hyperthyroid
- Short gut, small intestinal bacterial overgrowth
Petting Zoo exposure
Diagnostic Testing

• Infectious- stool for O & P, aerobic culture, C.diff
• Fecal elastase- fat malabsorption-pancreatic insufficiency? Cystic Fibrosis?
• Occult blood, fecal lactoferrin – IBD ?
Rotavirus
Traveler’s Diarrhea

• More common in travel to underdeveloped countries, PPI use, concurrent illness
• Prevention – handwashing, bottled water, food prep, cook food well
Reptiles = Salmonella exposure
Salmonella
C. diff

- Nosocomial problem
- Cautious use of antibiotic
- Good hygiene
- Tx Flagyl, then Vanco
Unpasteurized Cow’s milk
Common Causes

Food poisoning - bacterial toxins
Viral – Rotavirus
Parasitic - Giardia, Cryptosporidiosis
Bacterial - Salmonella, Shigella, C.diff, Campylobacter, E.Coli
Giardia
Pinworms
Pinworm – tx Vermox
Dehydration

• Weight loss- acute, chronic
• Urine output, SG- decreased, ketones
• Pulse, BP, RR- rapid pulse, low BP, panting?
• Capillary refill- delayed?
• Skin turgor-instant, tenting?
• Mental status-active, sleepy, apathetic?
• Eyes-sunken, vacant stare?
• Mucous membranes-dry, parched?, drooling?
• Tears- absent?,
• Thirst- refusing to drink?
Treatment

• Pedialyte- NOT soda, caution regarding gatorade as high sugar content
• Continue to breast feed
• Then alternate Pedialyte with formula- switch to soy or Nutramigen at times
• Half strength formula must be used with extreme caution as parents do NOT mix properly.
• Advance to BRAT diet, then Bland diet, advance as tolerated. ( Caution NOT to leave on prolonged BRAT diet and Pedialyte- dangerous!)
• IV rehydration- medications are never a substitute!
SEE THE PATIENT

• Dehydration MUST be managed in the OFFICE, NOT over the phone.
• Phone medicine is NOT an acceptable substitution.
• If a parent is told Pedialyte/Brat diet over the phone- they MUST be seen in the office if they call back.
• Children dehydrate FAST- especially with fevers, and if sleeping excessively.
• The BEST diagnostic medicine is a PE exam.
Dehydration/Malnutrition
Diabetic Ketoacidosis – Careful!

- Your blood sugar may be quite high before you notice symptoms, which include:
- Flushed, hot, dry skin.
- Blurred vision.
- Feeling thirsty and urinating a lot.
- Drowsiness or difficulty waking up.
- Rapid, deep breathing.
- A strong, fruity breath odor.
- Loss of appetite, belly pain, and vomiting.
- Confusion.
Hypernatremia Dehydration

- Breast fed infants – insufficient supply, poor feeding, jaundice
- Risk factors include first time mom, maternal narcotic use, preterm infant, early hospital discharge, lack of maternal support, wt loss, reluctant to supplements, not awakening to feed
- Leads to high sodium level, lethargy, increased sleeping, seizures, stroke
- Evaluate newborn first working day home from hospital- prevention is key, follow closely
Establish adequate breastfeeding
inadequate nutrition/feeding
Jaundice
Heat stroke - medical emergency

- Athletes, endurance sports, strenuous exercise
- High body temp
- Altered mental status
- Nausea/vomiting, dehydration
- Flushed skin
- Rapid HR, RR
- Headache
- Risk factors-age, weather, Sickle Cell Trait
Tx- Heat Stroke

- Immerse in cool water-reduce core body temperature
- Hydrate-fluid resuscitation
- Cool environment
- Do not return to play
- IV hydration if needed
Hydrate-
Nutrient Dense foods- CHO/Protein
Prior to Athletic Event
Appendicitis

• Starts by blockage of the hallow portion of the appendix, then increased pressure, decreased blood flow, bacterial overgrowth with increased inflammation
• Central abd pain migrates to RLQ in 12-24 hrs
• Rebound tenderness
• Point tenderness RLQ
• + rectal exam- tenderness of recto vesical pouch
Appendicitis

- Decreased appetite
- Gait can be affected at times with guarding
- Mild elevation in WBC, seg
- CAREFUL- temporarily improves after perforation before decompensation with peritonitis
- Clinical pearls- jump, flex hip, leg raises, affect??- helps on clinical exam in differential
Appendicitis
Magnet Ingestion

• Pose risk for bowel perforation/fistulas requiring endoscopy, bowel resection and serious gastrointestinal injury if swallowed

• Magnets can stick together and trap or compress portions of the bowel wall between them
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