Chronic Abdominal Pain in Children: Understanding Gut Feelings

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Chronic Abdominal Pain

Objectives:

- List clinical features distinguishing organic from functional chronic abdominal pain
- Describe the pathogenesis of functional abdominal pain
- Develop a management plan for functional abdominal pain in children
Recurrent Abdominal Pain

Chronic Abdominal Pain

Old Definition
At least 3 episodes of pain, over a period of 3 months in children >3 years of age, and affecting normal activities

Apley J et al. *Arch Dis Child* 1958;33:165

New Definition (Rome IV)
Abdominal pain at least once per week for at least 2 months

Hymes JS et al *Gastroenterology* 2016;150:1456
Case

9 year-old previously healthy girl
Intermittent abdominal pain --- 4 months

Etiology:
What are some of the causes to consider?

History:
What else to inquire in the history?

Physical Examination:
What to focus on examination?

Investigations:
What tests, if any, to order?
Chronic Abdominal Pain

Prevalence

- 10-30%
- Occurs most commonly between the age of 4 and 14 years
- Peak incidence at 4-6 and 7-12 years
Chronic Abdominal Pain

Prevalence

A prospective school-based study of abdominal pain and other common somatic complaints in children

Weekly questionnaire to students (grade III-VIII) in 2 Chicago public schools with mixed ethnicity and socioeconomic populations

n= 237 (132 girls), mean age 11.8 yrs

- Weekly prevalence of abdominal pain 38%
- 90% of children reported pain at least once

Chronic Abdominal Pain

Prevalence

A prospective school-based study of abdominal pain and other common somatic complaints in children

- Abdominal pain persisted >4 consecutive weeks in 52%
- Associated with higher anxiety and depression scores and worse quality of life
- 33% missed school (average 2.3 days)
- 10% of parents missed work (average 1.9 days)

Saps M et al. *J Pediatr* 2009;154(3),322
Chronic Abdominal Pain

5 - 10 % Organic
90 - 95 % Functional

The term “functional” means that no specific anatomic, metabolic, infectious, inflammatory or neoplastic cause can be found to explain the symptoms

The term “functional” being replaced by “Disorder of gut-brain interaction”
Chronic Abdominal Pain

Causes

- **Gastrointestinal**
  - Gut
  - Liver, gallbladder
  - Pancreas

- **Non-gastrointestinal**
Chronic Abdominal Pain

Gastrointestinal causes

- Gut
  - Esophagitis (GE reflux)
  - Peptic ulcer
  - Celiac disease
  - Crohn’s disease
  - Lactose intolerance
  - Constipation
  - Bowel obstruction (malrotation, etc.)

- Hepato-biliary

- Pancreatic
Chronic Abdominal Pain

Thinking outside the Bowel

Non-gastrointestinal causes

- Genitourinary (infection, obstruction)
- Abdominal wall pain
- Metabolic (e.g. porphyria)
Functional Abdominal Pain Disorders in children & adolescents

Rome IV Classification (2016)

- Irritable bowel syndrome
- Functional dyspepsia
- Abdominal migraine
- Functional abdominal pain (not otherwise specified)

Hymes JS et al Gastroenterology 2016;150:1456–68
Functional Abdominal Pain

Clinical Features

Characteristics of pain

- May occur in clusters lasting weeks
- Variable in severity (mild to severe)
- Once daily to several times per day
- Peri-umbilical to mid-epigastric or diffuse
- Non-radiating, difficulty describing character of pain
- No relationship to meals, etc, rarely nocturnal
- Typically affects normal activity
- May be totally incapacitating
## Chronic Abdominal Pain

### Psychosocial Issues

#### FAMILY
- Divorce/Separation
- Violence
- Abuse
- Financial stress
- Recent move
- Illness or death

#### SCHOOL
- Performance
- Learning disability
- Relationships
- Bullying
- Abuse
Functional Abdominal Pain

Clinical Features

- Normal growth
- Physical examination typically NORMAL
- Laboratory investigations NEGATIVE
Visceral pain is **REAL, not IMAGINED**

“Gut Feelings”
PSYCHOSOCIAL FACTORS

CNS

Brain-Gut axis

Enteric Nervous System

ALTERED MOTILITY

ABNORMAL VISCERAL PERCEPTION
Pathogenesis of Functional GI Disorders

Sensitizing Medical Events:
- Inflammation (infection, allergies)
- Trauma
- Stress

Psychosocial Events:
- Family stress
- Coping style
- Anxiety/Depression

Genetic Predisposition

Gut microbiome

VISCERAL HYPERALGESIA

Disability

Early Life Events
“Red Flags” in the evaluation of Chronic Abdominal Pain

**History:**
- Well localized pain away from the umbilicus
- Frequent night pain?
- Nocturnal diarrhea
- Rectal bleeding
- Frequent vomiting
- Dysphagia/Odynophagia
- Involuntary weight loss, growth failure
- Extra-intestinal symptoms (fever, rash, arthralgia)
- Positive family history (Crohn, celiac, peptic ulcer)
“Red Flags” in the evaluation of Chronic Abdominal Pain

Physical Examination

- Poor growth
- Pallor
- Digital clubbing
- Abdominal mass
- Extra-intestinal signs (oral ulcers, fever, rash, arthritis)
Getting to the bottom of Chronic Abdominal Pain

Peri-anal examination
(skin tags, fissures, fistula in Crohn disease
“Green Flags” in the evaluation of Chronic Abdominal Pain

- Persistent pain that does not change with physiological activities
- Presence of several other somatic symptoms
- “Nothing works” (side effect with every medication)
- Family history of IBS
- Anxious/catastrophizing parents
Chronic Abdominal Pain

Investigations

Avoid a “Shotgun” approach
Chronic Abdominal Pain

Investigations

Helpful:
- Complete blood count
- IgA-TTG antibody
- Fecal calprotectin

Not Helpful:
- Everything else………. 
Chronic Abdominal Pain

**Testing for Helicobacter pylori**

- No association between recurrent abdominal pain and H. pylori infection in children (meta-analysis from 14 cross sectional studies)
- Unlike in adults, there is no evidence in children that H. pylori gastritis causes dyspeptic symptoms in the absence of peptic ulcer
- Diagnostic testing for *H. pylori* infection NOT recommended in children with recurrent abdominal pain (“Test and Treat” strategy should not be used)

Joint ESPGHAN/NASPGHAN Guidelines for the Management of Helicobacter pylori in Children and Adolescents (Update 2016)
Chronic Abdominal Pain

Role of GI Endoscopy
Chronic Abdominal Pain

Does endoscopy have any therapeutic value?

The Prognostic Value of Obtaining a Negative Endoscopy in Children With Functional Gastrointestinal Disorders

Silvana Bonilla, MD, MS¹, Deli Wang, PhD¹, and Miguel Saps, MD¹

- 301 children with abdominal pain-related FGIDs
- Among patients with endoscopies, 61% reported pain
- Among patients without endoscopies, 64% were symptomatic (P = 0.76)
- A negative endoscopy does not improve the outcome of FGID.

Referral letter to GI clinic by a family physician

Could you please see this girl regarding chronic abdominal pain in periumbilical area, intermittent no known aggravating factors, growing properly, mom worries about her. Blood tests for celiac disease and other diseases are fine.

Sincerely,

Concern

Is something being missed?
Functional Abdominal Pain

Management

Objective is to prevent the illness from leading to social dysfunction and NOT total freedom from pain and associated symptoms

Biopsychosocial model of care

- Education & Reassurance
- Diet & Drug treatments?
- Psychological interventions
- Continued support
Functional Abdominal Pain Disorders

**Management**

- Emphasize that the pain is REAL
- Explain suspected mechanisms
- Tell family you know exactly what child has
- Give a POSITIVE diagnosis (diagnostic label)
Functional Abdominal Pain Disorders

Management

- Positive approach
- Elicit and allay specific concerns (cancer, etc.)
- Lifestyle must be normalized
- Regular school attendance is essential
- Discuss prognosis
Functional Abdominal Pain Disorders

Management

"Stomach is the nursery of all diseases"

Al-Harith bin Kaldah
Arabian physician (670 AD)
Dietary interventions for recurrent abdominal pain in childhood

27 studies, 19 RCT (n=1453, 4-18 year-old)
- probiotic-based interventions
- fibre-based interventions
- low FODMAP diet
- fructose restriction

Moderate- to low-quality evidence suggesting that probiotics may be effective

Probiotics

- Helpful in selected cases, especially IBS
- 5 RCT (n=464)
- *L. rhamnosus, L. reuteri,* or VSL#3®
- Increased treatment success (RR1.5, CI 1.2-1.8)

Probiotics

- *Lactobacillus rhamnosus* GG
- *Lactobacillus reuteri*
- VSL#3® (8 strains-*Lactobacillus, Bifidobacteria*)
- *Saccaromyces boulardii*
FODMAPs

- **Fermentable Oligo-saccharides**
- **Disaccharides**
- **Mono-saccharides**
- **Polyols**

- Fructose (fruits, honey, high fructose corn syrup, etc)
- Lactose (dairy)
- Fructans (wheat, garlic, onion, inulin, etc)
- Galactans (legumes eg; beans, lentils, soybeans, etc)
- Polyols (sweeteners containing sorbitol, mannitol, xylitol and stone fruits, etc)
Medications generally not effective
Avoid analgesics
Pharmacological interventions for recurrent abdominal pain in childhood

16 studies (n=1024, 4-18 year-old)
- tricyclic antidepressants
- 5-HT4 receptor agonists
- serotonin antagonists
- selective serotonin re-uptake inhibitors
- anti-spasmodics
- anti-histamines
- histamine-2 receptor antagonists
- dopamine receptor antagonist
- antibiotics

There is currently no convincing evidence to support the use of drugs to treat RAP in children

Drug treatment of functional abdominal pain disorders?

- Dyspepsia
  - acid suppression, prokinetic
- Abdominal pain
  - probiotics, anti-cholinergics
- Constipation
  - fiber, PEG3350/other laxatives
- Diarrhea
  - anti-motility agents, binding agents (resins)
- Abdominal bloating, “gas”
  - simethicone, motility agents?
Drug treatment of functional abdominal pain? *(Beneficial)*

- Irritable bowel syndrome
  - peppermint oil enteric coated capsules
- Abdominal migraine
  - pizotifen

Cyproheptadine

Non-selective serotonin (5-HT) receptor antagonist, mild anti-cholinergic effects

- Used in treatment of several functional GI disorders (FAP, FD, IBS, AM, CVS)
- Variably effective
- Dose:
  - 2 mg, 2 to 3 times daily (maximum 12 mg daily) in children 2 to 6 yrs
  - 4 mg, 2 to 3 times daily (maximum 16 mg daily) in children 7 to 14 yrs
  - 4 mg, 3 times daily (maximum 0.5 mg/kg daily) in patients age >15 yrs
- Adverse effects
  (increased appetite, weight gain)

Amitriptyline
Tertiary amine tricyclic antidepressant, anti-cholinergic effects

- Studied in treatment of FAP and IBS
- Variable results
- Dose:
  - 10 to 30 mg daily at night
- Adverse effects
  (sedation, dry mouth, constipation, etc.)

Power of Placebo!!

Placebos without Deception: A Randomized Controlled Trial in Irritable Bowel Syndrome

Ted J. Kaptchuk¹,², Elizabeth Friedlander¹, John M. Kelley³,⁴, M. Norma Sanchez¹, Efi Kokkotou¹, Joyce P. Singer², Magda Kowalczykowski¹, Franklin G. Miller⁵, Irving Kirsch⁶, Anthony J. Lembo¹

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Abstract

Background: Placebo treatment can significantly influence subjective symptoms. However, it is widely believed that response to placebo requires concealment or deception. We tested whether open-label placebo (non-deceptive and non-concealed administration) is superior to a no-treatment control with matched patient-provider interactions in the treatment of irritable bowel syndrome (IBS).

Methods: Two-group, randomized, controlled three week trial (August 2009-April 2010) conducted at a single academic center, involving 80 primarily female (70%) patients, mean age 47±18 with IBS diagnosed by Rome III criteria and with a score ≥150 on the IBS Symptom Severity Scale (IBS-SSS). Patients were randomized to either open-label placebo pills presented as "placebo pills made of an inert substance, like sugar pills, that have been shown in clinical studies to produce significant improvement in IBS symptoms through mind-body self-healing processes" or no-treatment controls with the same quality of interaction with providers. The primary outcome was IBS Global Improvement Scale (IBS-GIS). Secondary measures were IBS Symptom Severity Scale (IBS-SSS), IBS Adequate Relief (IBS-AR) and IBS Quality of Life (IBS-QoL).

Findings: Open-label placebo produced significantly higher mean (±SD) global improvement scores (IBS-GIS) at both 11-day midpoint (5.2±1.0 vs. 4.0±1.1, p<.001) and at 21-day endpoint (5.0±1.5 vs. 3.9±1.3, p=.002). Significant results were also observed at both time points for reduced symptom severity (IBS-SSS, p = .008 and p = .03) and adequate relief (IBS-AR, p = .02 and p = .03); and a trend favoring open-label placebo was observed for quality of life (IBS-QoL) at the 21-day endpoint (p = .08).

Conclusion: Placebos administered without deception may be an effective treatment for IBS. Further research is warranted in IBS, and perhaps other conditions, to elucidate whether physicians can benefit patients using placebos consistent with informed consent.

Kaptchuk TH et al. Plos ONE. 2010;5(12):e15591
Functional Abdominal Pain

Management

Goals:
- Decrease interference caused by pain
- Increase management or ability to cope with pain

Psychological therapies
Psychological Therapies

• Distraction
• Relaxation techniques (deep breathing exercises)
• Guided Imagery/Hypnotherapy
• Biofeedback
• Cognitive behavioral therapy
• Others ……….
Functional Abdominal Pain

Pain behavior evokes a characteristic reinforcement response by the parents, school and the physician

Examples of reinforcement of pain:

- Attention given to child at time of pain (massaging abdomen, using heating pad)
- Lying down on bed or couch during pain
- Medication at time of pain
- Absence from school on days of pain
- Leaving school when pain occurs
Psychological interventions for recurrent abdominal pain in childhood

26 studies, 18 RCTs (n=828, 6-18 year-old)
- cognitive behavioural therapy (CBT)
- hypnotherapy (including guided imagery)
- yoga
- written self-disclosure

Some evidence for beneficial effects of CBT and hypnotherapy in reducing pain in the short term

FDA permits marketing of first medical device for relief of pain associated with irritable bowel syndrome in patients 11-18 yrs of age
07, June 2019

IB-Stim
- percutaneous electrical nerve field stimulator (PENFS) system
- single-use electrical nerve stimulator placed behind the ear.
- The battery-powered chip of the device emits low-frequency electrical pulses continuously for 5 days, at which time it is replaced.
- device can be used for 120 hours per week up to 3 consecutive weeks
Functional Abdominal Pain

Management

CONTINUED SUPPORT

Normalize the child **NOT** the pain
Functional Abdominal Pain

Prognosis

Generally good

- Median follow-up of 5 years, pain in only 29% (18 prospective studies, n=1,331)

- Symptom improved in 85% by 2 months, improvement maintained at 1 and 5 years (followed in GI clinic, n=132)
  Mulvaney S et al. *J Am Acad Adoles Psychiatry* 2006;45:737
**Functional Abdominal Pain**

*Prognosis*

- Factors associated with persistent abd. pain:
  - “painful family”
  - age <6 years at diagnosis
  - duration >6 months before seeking treatment
  - negative life events
  - increased symptoms of anxiety and depression

- More likely to have emotional and psychiatric disorders later in life

- Parental factors rather than the psychological characteristics of the child more important
Chronic Abdominal Pain

TAKE-HOME POINTS

- A common problem in children
- Most cases are functional (non-organic)
- Diagnosis by history and physical exam
- Investigations should be limited
- Treatment: Education, Reassurance, Support. Psychosocial interventions, cognitive behavioral therapy are helpful
Resources

North American Society for Pediatric Gastroenterology, Hepatology & Nutrition (NASPGHAN)

Welcome to GIKids

Children's Digestive Health Information for Kids and Parents

Millions of children are living with pediatric digestive and nutritional disorders. GIKids provides easy to understand information about the treatment and management of these pediatric digestive conditions for children and parents.

We welcome you to explore GIKids to learn more about pediatric digestive disorders, how they are diagnosed, the treatment and management of conditions, and our patient and parent resources.

Join Our Growing Community:

Facebook, Twitter, Instagram

www.gikids.org
Digestive Topics

Functional Abdominal Pain

Abdominal Pain - Functional

Children who complain of stomach aches for over three months are likely to have functional abdominal pains. Download the GIKids Functional Abdominal Pain Fact Sheet to understand more about diagnosing and coping with Functional Abdominal Pain.

Fact Sheets

English

Spanish

French

What is functional abdominal pain, and why does it happen?

Most otherwise healthy children who repeatedly complain of stomach aches for two months or more have functional abdominal pain. The term “functional” refers to the fact that there is no blockage, inflammation or infection causing the discomfort. Nevertheless, the pain is very real, and is due to extra sensitivity of the digestive organs, sometimes combined with changes in gastrointestinal movement patterns. The child’s intestine has a complicated system of nerves and muscles that helps move food forward and carry out digestion. In some children, the nerves become very sensitive, and pain is experienced even during normal intestinal functions.

The pain can cause the child to cry, make their face pale or red, and cause them to break into a sweat. This digestive tract sensitivity can be triggered by a variety of things, such as a viral or bacterial infection, stress, or an episode of constipation. Other family members may have a history of similar problems. Because of the pain, children often stop their usual school and play activities. Fortunately, despite the recurrent episodes of pain, normal growth and general good health continue.

How common is functional abdominal pain?
Resources/References

• http://www.gikids.org/content/38/en/functional-abdominal-pain
• http://pediatrics.aappublications.org/cgi/content/full/115/3/812
• http://www.aboutkidsgi.org/site/about-gi-health-in-kids/
• functional-gi-and-motility-disorders/abdominal-pain-or-bellyaches
• http://www.acg.gi.org/patients/gihealth/functionalab.asp
• https://www.iffgd.org/
• Hymes JS et al. *Gastroenterology* 2016;150:1456