Primary Care Evaluation of Acute and Chronic Abdominal Pain

Rina Sanghavi, MBBS, MD, FAAP
Director, Neurogastroenterology and GI motility
Co-director - Functional abdominal pain program and Pediatric Aerodigestive program
Associate Professor of Pediatrics
University of Texas Southwestern Medical Center
Children's Health Childrens Medical Center Dallas

Conflicts of Interests Disclosure
In the past 12 months, I have had the following relevant financial relationships with the following manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity:

- Sucampo Pharmaceuticals - research grant support
- Abbott Nutrition - Speaker's Bureau

I do not intend to discuss an unapproved or investigative use of a commercial product or device in my presentation.

Course Objectives
Upon completion of this educational activity participants will be:

- Differentiate between organic and non-organic chronic abdominal pain.
- Review history taking, physical exam findings, diagnostics tests and differential diagnosis that could help to differentiate between functional and organic abdominal pain.
- Identify psychosocial factors associated with chronic functional abdominal.
- Discuss the therapeutic management of functional abdominal pain.
What is pain?

From the International Association for the Study of Pain:

“an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”

Etymology:

Middle English, from Anglo-French peine, from Latin poena, from Greek poïné, payment, penalty
The sensation of pain represents an interplay of pathophysiologic and psychosocial factors:

- **Physiologic determinants:**
  - Nature of stimuli
  - Type of receptor involved
  - Organization of neuroanatomic pathways from the site of injury to the central nervous system
  - Complex interaction of modifying influences on the transmission, interpretation, and reaction to pain messages.

- **Psychosocial factors modifying the sensation of pain include:**
  - Personality
  - Ethnic and cultural background
  - Circumstances surrounding the injury

- Sensory neuroreceptors in abdominal organs are located within the mucosa and muscularis of hollow visceras, on serosal structures such as the peritoneum, and within the mesentery.

- In addition to nociception (the perception of noxious stimuli), sensory neuroreceptors also are involved in the regulation of secretion, motility, and blood flow via local and central reflex arcs.
Although sensory information conveyed in this manner usually is not perceived, disordered regulation of these gastrointestinal functions (secretion, motility, and blood flow) can cause pain. For example, patients with irritable bowel syndrome perceive pain related to heightened sensitivity of gut afferent neurons to normal endogenous stimuli that results in altered gut motility and secretion.


What is pain? - Continued

Types of pain/pain pathways
- Evaluation and management of acute abdominal pain
  - History
  - Physical examination
  - Labs
- Evaluation & management of chronic abdominal pain
  - History
  - Physical Examination
  - Labs

Course Outline

Clinically, pain falls into three categories:
- Visceral (splanchnic pain)
- Parietal pain
- Referred pain
Visceral pain
- Occurs when noxious stimuli affects an organ
- Stretching and ischemia
- Tissue congestion and inflammation
  - Sensitize nerve endings
  - Lower the threshold for stimuli
- Unmyelinated fibers
  - Enter spinal cord at multiple levels
  - DULL and MIDLINE

Parietal pain
- Noxious stimulation of the parietal peritoneum
  - Inflammation
  - Stretching
- Transmitted through myelinated fibers
  - Specific Dorsal root ganglia
  - Same dermatome level as pain
- Sharp, intense and localized
- Aggravated by coughing

Referred pain
- Is felt in areas remote from diseased organ
- Results when visceral afferent neurons and somatic afferent neurons from a different anatomic region converge on second-order neurons in the spinal cord at the same spinal segment
- May be felt in skin or deeper tissues but usually well localized
- Generally appears as the noxious visceral stimulus becomes more intense
Examples of referred pain

- Diaphragmatic irritation from a subphrenic hematoma or abscess results in shoulder pain
- Pneumonia causes abdominal pain as the T9 dermatome distribution is shared by the lung and abdomen

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Acute Abdominal Pain
Goal is to establish an early, efficient, accurate diagnosis

- History and physical exam are key
- Accurate diagnosis can be made with:
  - Description of the chronology, location, intensity, character of the pain
  - Aggravating and alleviating factors
  - Other symptoms
  - Medical history

Evaluating acute abdominal pain - Continued

- Thorough physical examination will verify diagnostic suspicions that arose from the history
- Selective use of laboratory and radiographic examinations provide further objective evidence
- In some cases, diagnosis is obscure despite exhaustive evaluation

Evaluating acute abdominal pain - Continued

- In most settings in which patient’s clinical status is stable, repetitive examination over time will clarify diagnostic uncertainty
  - In this situation, admission to the hospital for serial abdominal examinations or close phone or office follow-up may be necessary
- When the patient’s clinical status is deteriorating and diagnostic uncertainty remains, surgical exploration may be necessary
### Causes of acute abdominal pain in children

<table>
<thead>
<tr>
<th>GI Causes:</th>
<th>Non-GI Causes:</th>
<th>Hematological Causes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Gastroenteritis/food poisoning</td>
<td>- UTI</td>
<td>- Sickle Cell disease</td>
</tr>
<tr>
<td>- Appendicitis</td>
<td>- Urinary calculi</td>
<td>- HSP</td>
</tr>
<tr>
<td>- Constipation</td>
<td>- Menses related problems</td>
<td>- HUS</td>
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<td>- Intestinal obstruction</td>
<td>- Pregnancy/complications</td>
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<td>- Perforia</td>
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### Clinical evaluation: History

<table>
<thead>
<tr>
<th>Condition</th>
<th>Onset</th>
<th>Location</th>
<th>Character</th>
<th>Descriptor</th>
<th>Radiation</th>
<th>Intensity</th>
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<tbody>
<tr>
<td>Appendicitis</td>
<td>Gradual</td>
<td>Periumbilical early, RLQ late</td>
<td>Diffuse early, localized late</td>
<td>Ache</td>
<td>RLQ</td>
<td>++</td>
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<tr>
<td>Cholecystitis</td>
<td>Rapid</td>
<td>RUQ</td>
<td>Localized</td>
<td>Consticting</td>
<td>Spagula</td>
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<tr>
<td>Hemorrhoids</td>
<td>Rapid</td>
<td>Epigastric, back</td>
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<td>Bering</td>
<td>SBD back</td>
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<td>Enterobacter pylori ulcer</td>
<td>Subacute</td>
<td>Epigastric</td>
<td>Localized early, diffuse late</td>
<td>Bering</td>
<td>None</td>
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<td>Small bowel obstruction</td>
<td>Gradual</td>
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| Intensity | LLQ = left lower quadrant; LQ = lower quadrant; RLQ = right lower quadrant; RUQ = right upper quadrant |

### Comparison of common causes of acute abdominal pain

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Rapidity of onset, progression and duration of symptoms

- Rapidity of onset can be a measure of severity of underlying disorder
- Pain that is sudden in onset, severe and well-localized is likely an intra-abdominal catastrophe such as a perforated viscus, mesenteric infarction

Progression is an important temporal factor

- In disorders such as gastroenteritis, pain is self-limited
- In disorders such as appendicitis, pain is progressive
- Colicky pain has a crescendo-decrescendo pattern that may be diagnostic, as in renal colic

The duration of abdominal pain is also important

- Patients who seek evaluation of abdominal pain that has been present for an extended period of time (e.g. weeks) are less likely to have an acute, life-threatening illness than are patients who present within hours to days of the onset of their symptoms
Patterns of acute abdominal pain

A: Gastroenteritis
B: Intestinal, renal, and biliary pain ("colic")
C: Appendicitis
D: Certain conditions have a catastrophic onset, such as ruptured viscus

Clinical evaluation: Location, intensity, character

- Location
- Intensity and character: difficult to measure
  - Depends on past experiences, personality, culture

Different pain scales for children

Happy-Sad Nine Face Scale
Different pain scales for children - Continued

- Word Graphic Scale

<table>
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<tr>
<th>No pain</th>
<th>Little pain</th>
<th>Medium pain</th>
<th>Large pain</th>
<th>Worst possible pain</th>
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- Visual Analogue Scale

- Pain Ladder (Jeans and Johnston 1985)

- Oucher.org
Clinical evaluation

Aggravating/alleviating factors:
- Peritonitis
- Lie motionless
- Renal colic
- Moving a lot
- Fatty foods
- Biliary pain
- Duodenal ulcer
- Better with meals
- Gastric ulcer
- Worse after eating

Associated Symptoms
- Clear vomitus
- Gastric outlet obstruction
- Bilious emesis
- Obstruction beyond stomach

Clinical evaluation - Continued

- Family and social history
  - Sickle cell disease
  - Familial Mediterranean fever in patients of Armenian or Sephardic Jewish heritage

Physical examination

- Patient with CP/MR, developmentally delayed, non-verbal
- Systematic exam
- Abdominal exam:
  - Tenderness and rigidity
  - Distention
  - Scars
  - Hernias
  - Muscle rigidity
  - Splinting during respiration
  - Ecchymoses
  - Visible hyperperistalsis
  - Tympany
Physical examination - Continued

- Light, gentle palpation superior to deep palpation for identifying peritoneal irritation
  - May be detected by more innocuous measures
    - Shaking the bed
    - Asking the patient to breath deeply or cough

- Organ enlargement, tumor or inflammation may produce a palpable mass
- Potential hernia orifices should be examined
- To avoid eliciting pain
  - Gently palpitate the abdomen
  - Begin at point of least tenderness
  - Proceed to point of greatest tenderness.

Laboratory

- CBC with differential
- Urinalysis
- Electrolytes, BUN, Creatinine (if indicated)
- Pregnancy test
- Liver function tests - RUQ pain
Radiology
- X-ray - chest/KUB
- Sonogram
- CT
- MRI
- Other:
  - Endoscopy
  - Diagnostic laproscopy (57% - 98% yield)
  - Exploratory laparotomy

Acute abdomen

Acute abdomen - Continued
### Acute abdominal pain: Consult indicators

Indicators for a surgical or GI consult in patient with acute abdominal pain:
- Severe or increasing abdominal pain with progressive signs of deterioration
- Bile-stained or feculent vomitus
- Involuntary abdominal guarding or rigidity
- Rebound abdominal tenderness

### Consult indicators - Continued

Indicators for a surgical or GI consult in patient with acute abdominal pain:
- Marked abdominal distension with diffuse tympany
- Signs of acute fluid or blood loss into the abdomen
- Significant abdominal trauma
- Suspected surgical cause for pain
- Abdominal pain without an obvious etiology

### Course Outline

- What is pain?
- Types of pain/pain pathways
- Evaluation and management of acute abdominal pain
  - History
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  - Labs
- Evaluation & management of chronic abdominal pain
  - History
  - Physical Examination
  - Labs
Chronic Abdominal Pain

Chronic/recurring abdominal pain
Functional abdominal disorders

Structural or organic disorders:
- Peptic ulcer disease
- Gallstones
- Chronic pancreatitis
- Abdominal neoplasms
- Inflammatory bowel diseases
- Mesenteric ischemia
- Pelvic inflammatory diseases
- Endometriosis
- Abdominal adhesions
- Intestinal obstruction
- Chronic constipation
### Causes of chronic abdominal pain - Continued

Functional gastrointestinal disorders - by far the most common cause of chronic abdominal pain
- Irritable bowel syndrome
- Functional (non-ulcer) dyspepsia
- Functional abdominal pain syndrome
- Biliary pain:
  - Gallbladder dysfunction
  - Sphincter of Oddi dysfunction

### Pathophysiology of chronic abdominal pain

- Chronic pain is multidimensional
  - Sensory
  - Emotional
  - Cognitive
- Abnormalities in neurophysiologic functioning at afferent, spinal, and central nervous system (CNS) level

### Pathophysiology - Continued

- Not associated with increased afferent visceral stimuli from structural abnormalities and tissue damage
- Motility is not abnormal
- Pain in FAPS results from CNS amplification (i.e. lack of down-regulation) of incoming regulatory visceral afferent signals, which reach conscious awareness
- Brain-gut axis

ROME III criteria for Childhood Functional Abdominal Pain

Must include ALL of the following:

■ Episodic or continuous abdominal pain
■ Insufficient criteria for other functional GI disorders
■ No evidence of an inflammatory, anatomic, metabolic or neoplastic process that explains the subject’s symptoms
■ Criteria must be fulfilled at least once per week for at least two months prior to diagnosis

ROME III criteria for Childhood Functional Abdominal Pain Syndrome (FAPS)

■ Satisfy criteria for Childhood FAP
■ Have one or more of the following 25% of the time:
  ▪ Some loss of daily functioning
  ▪ Additional somatic symptoms such as:
    • Headache
    • Limb pain
    • Difficulty sleeping
■ Criteria must be fulfilled at least once per week for at least two months prior to diagnosis

Evaluation of chronic abdominal pain: History

■ Patient often in distress when first seen
■ Pain is long standing
■ Severe- “Worst ever experienced”
■ Generalized, diffuse, or very localized
■ Is a central point in the patient's life
  ▪ “Life would be fine if you would just take the pain away”
■ Described as “nauseating”; “knife-like”
■ Constant, not influenced by eating or defecation
Thorough and detailed history:
- Initial questions directed at the patient
  - Important to hear complaints in patient’s own words
  - Minimize influence of parents on patient’s responses
- Ask about symptom onset and temporal cues

Evaluation of chronic pain: History - Continued

History of trauma or recent significant changes?
- Can include emotional/physical abuse, death or divorce within the family
- These common events can independently predict a poorer clinical outcome
- Symptoms may exacerbate soon after these events and/or recur

If pain has been longstanding, why is patient presenting now?
- Inquire if pain wakes the patient up from sleep
- What is patient’s (or patient’s parents) understanding of the illness
  - Important for joint treatment planning
- What is impact of pain on activities and quality of life?
Is there an associated psychiatric diagnosis?
- Up to 60% of FAP patients may have a comorbid psychiatric diagnosis
- Some diagnoses are treatable, some are not
  - All are likely to affect the course of treatment

What is the role of family or culture?
- Look for reinforcement (benefits of being sick)
- Illness as an adaptive means to divert family distress
- Pain as acceptable way to express psychological distress
- May co-exist with pancreatitis or inflammatory bowel disease

Differentiate between pain due to organic disease and FAPS
- Well-defined GI disorder:
  - Several operations
  - Chronic abdominal pain
- Ask about stool frequency
- History of physical or sexual abuse
- Poor social networks
- Ineffective coping strategies
Patient/parent behavior in FAPS

- Often demand the physician not only diagnose their problem but fix it rapidly
- Deny a relationship between problem and other psychologically disturbing issues
- Accompanying parent takes over responsibility of relaying history
- Common request for pain medication
  - Scared that pain has lasted this long

Physical examination in FAPS

- Tachycardia, diaphoresis and BP changes
  - Acute peripheral source of pain
- Multiple surgical scars
- “Closed eye sign”
- Stethoscope sign
- Carnett’s test

Laboratory- NOT indicated routinely

- CBC
- LFTs
- Amylase/Lipase
- Comprehensive metabolic panel
- Stool for occult blood
- KUB
- Referral to pediatric GI
  - Multi-disciplinary chronic abdominal pain clinic
  - Endoscopy
Red Flags
- Fever
- Anorexia, weight loss
- Pain that awakens patient
- Blood in stool or urine
- Jaundice
- Edema
- Abdominal mass or organomegaly
- Vomiting
- Localized pain away from midline
- Altered bowel habits
- Growth disturbance
- Family history: IBD, ulcer

TREATMENT OF FAP/S
Consists of 3 key techniques:
1. Identifying and removing stressors on the gut
2. Enabling the GBA to reduce stress via cognitive behavior therapy (CBT)
3. "Numbing"/reducing signals going from the gut to the brain
Most important- explain the pathophysiology in EASY words to the patient

TREATMENT OF FAP/S
1. Identifying and removing stressors on the gut Goal:
   1. Relieve abdominal pain and discomfort
   Anticholinergic drugs (commonly used are dicyclomine and hyoscamine). Mech of action: block M receptors
   Hyoscamine- commonly used dose 0.125 mg sublingual tablet for adults
   2. Relieve distension/bloating
   - Use of simethicone/Gas-X, metronidazole for SIBO-10mg/kg/dose three times a day x 10 days
   3. Improve bowel function
   For diarrhea: anti diarrheals (especially loperamine)
   For constipation: laxatives (bulk forming or osmotic)
TREATMENT OF FAP/S

2. Enabling the GBA to reduce stress via cognitive behavior therapy (CBT)

TREATMENT OF FAP/S

3. “Numbing”/reducing signals going from the gut to the brain
   - Achieved with selective medications such as amitryptilline
   - Start with 1-2 mg/kg/dose; max of 50mg per day - QHS.
   - EKG needed prior
   - Can also use Gabapentin - start with once a day; increase as needed
   - Other TCAs such as zoloft may also help - Effect more on the co morbid diagnosis

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Key points

- Most cases represent a functional process
- Red flag findings indicate physiologic cause and need for further assessment
- Testing is guided by clinical features
- Repeated testing after physiologic causes are ruled out usually counter-productive
- Children’s health has a chronic abdominal pain clinic which includes a psychology team, GI physician and pain team

QUESTIONS?