Abdominal Pain: A Common Complaint in College Health

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Objectives

- Upon completion of this lecture, the participant will be able to:
  1. Perform a comprehensive abdominal examination
  2. Differentiate between a variety of diagnoses pertaining to the patient with an abdominal complaint
  3. Identify various abdominal emergencies

Statistics

- Abdominal pain is one of the most common presenting complaints in primary care
- Acute abdominal pain is the most common cause of hospitalization
- One study: Approximately 40% of patients who present with abdominal pain have no identifiable cause and <15% have surgical etiology

History

- Description of onset
  - sudden, gradual
- Progression since onset
  - better, worse, same
- History of previous episode
- Location
  - RUQ, RMQ, RLQ, LUQ, LMQ, LLQ, epigastric, periumbilical, or suprapubic

- Character
  - intermittent, steady, colicky
- Severity
  - 1-10 scale
  - Has it affected the person’s ADL’s
- Radiation
  - Intraabdominal
  - Extraabdominal locations

- Aggravating Factors
  - Movement, coughing, eating, respirations
- Alleviating Factors
  - Position, vomiting, flatulence, eating, meds
- Associated Symptoms
  - Nausea, vomiting, constipation, diarrhea, fever, chills, bloating, flatulence, eructation, black or bloody stools or vomitus, jaundice
Review of Systems

- Cardiac
  - Chest pain, palpitations
- Respiratory
  - Shortness of breath, cough, dyspnea
- Genitourinary
  - Dysuria, frequency, urgency, hematuria, gynecologic complaints, LMP

Additional History

- Past surgical history
- Medications
- Drug, food, or environmental allergies
- Cigarette, alcohol, drug or caffeine use
- Diet and food intolerance’s
- Travel
- Family history
- Psychosocial information

Physical Examination

- General appearance
  - Restless
  - Rigid and motionless
  - Lying in a fetal position or rocking back in forth
- Vital signs
  - Orthostatic pulse and blood pressure
    - Tachycardia: acute abdomen
  - Temperature
    - Infectious or inflammatory process

Physical Examination

- Skin
  - Pallor: dissecting aneurysm, gastric ulcer
  - Diaphoresis: peritoneal inflammation
  - Mottling: dissecting aneurysm
  - Turgor: pancreatitis
  - Jaundice: hepatitis
- Eyes
  - Scleral icterus: hepatitis

Abdominal Examination

- Inspection
  - Contour of abdomen
    - Flat
    - Scaphoid
      - Malnourished
    - Protuberant
      - Obesity
      - Gas distention from obstruction
      - Tumor
      - Pregnancy
      - Ascites

Abdominal Examination

- Inspection
  - Skin
    - Color and moisture
    - Scars and incision
    - Striae (Cushing’s syndrome)
    - Dilated veins (Portal hypertension, cirrhosis)
    - Rashes or lesions (Cherry angiomas, herpes zoster, linea nigra)
## Abdominal Examination

### Inspection
- Symmetry
- Visible Organ Enlargement/Masses
  - Hernia: defect in the wall of the abdomen through which a mass of tissue and occasionally the intestine protrudes
    - Should be reducible

### Abdominal Examination

### Inspection
- Umbilicus
  - Contour (normally round; inverted or everted)
    - Bulge-umbilical hernia
  - Oomphylitis
    - Staphylococcus infection of the umbilicus
    - Can be chronic in some individuals
    - Thought to be caused by a remnant of the umbilical cord attachment
    - Treated with 1st Generation Cephalosporin

### Abdominal Examination

### Auscultation
- Bowel sounds
  - Very unreliable
  - Can be normal in the setting of serious pathology
  - Borborygmi: loud, prolonged gurgles that are indicative of hyperperistalsis
    - Intestinal obstruction
    - Gastroenteritis

### Abdominal Examination

### Palpation
- Essential when assessing the abdomen
- Light palpation
  - Lightly palpate the entire abdomen
  - Purpose:
    - Identify abdominal tenderness
    - Superficial masses
    - Muscular rigidity or guarding

### Abdominal Palpation

### Deep palpation
- Palpate all 4 quadrants
- Purpose
  - Identify masses
  - Peritoneal inflammation
    - Rebound Tenderness (Blumberg’s sign): Press fingers firmly and slowly in the area above the pain. Quickly withdraw your fingers
      - Watch the individual and listen for pain
      - Pain induced by withdrawal: +rebound

### Liver Palpation

### Majority of the liver is under the right rib cage
- Place left hand behind and parallel to the patient to support the 11th and 12th ribs
- Press up with the left hand
- Place your right hand on the abdomen in the RUQ with your fingertips well below the lower border of the liver
- Press in with the right hand while the patient takes a deep breath
Liver

Liver normally feels soft, sharp, regular, smooth, and slightly tender.

Palpation of the Spleen

- Located in the left upper quadrant
- Enlarges anteriorly, downward, and medially
- Palpation can confirm an enlargement identified with percussion but often misses the splenomegaly that doesn’t descend below the costal margin
- A small percentage of individuals normally have a palpable spleen edge

Technique

- With left hand, reach over and around the patient placing left hand under the lower rib cage
- With right hand, palpate the right upper quadrant while the patient takes a deep breath
- Tip may descend to meet your fingers

Costovertebral Angle Tenderness

- Tap gently on the area above the 10-12th ribs posteriorly
- Continue tapping as you move downward
- “What if anything do you feel?”
- CVAT-pyelonephritis

Differential Diagnosis According to Location

- Right Upper Quadrant
  - Cholelithiasis
  - Cholecystitis
  - Hepatitis
  - Hepatic carcinoma
  - Right kidney stone
  - Right pyelonephritis
  - Right lower lobe pneumonia

- Left Upper Quadrant
  - Splenic rupture
  - Splenic infarction
  - Left kidney stone
  - Left pyelonephritis
  - Gastritis
  - Left lower lobe pneumonia
Differential Diagnosis According to Location

Epigastric Region
- Gastritis
- Gastric ulcer
- Gastric cancer
- Esophagitis
- Duodenal ulcer
- Pancreatitis
- Pancreatic cancer

Right Lower Quadrant
- Appendicitis
- Meckel’s diverticulum
- Crohn’s disease
- Right ovarian cyst
- PID
- Inguinal hernia
- Diverticulitis
- Ectopic pregnancy

Left Lower Quadrant
- Diverticulitis (Sigmoid)
- Left ovarian cyst
- PID
- Inguinal hernia
- Ectopic pregnancy
- Appendicitis (rarely)

Hypogastric
- PID
- Irritable Bowel Syndrome
- Ulcerative Colitis
- Ectopic pregnancy
- Cystitis

Generalized Pain
- Peritonitis
- Gastroenteritis
- Obstruction
- Dissecting Aortic Aneurysm

Don...
Don is a 17 yowm who presents with an 8 hour history of worsening abdominal pain. Woke him from sleep. Epigastric at onset. Now seems lower in right side of abdomen. Associated with nausea and vomiting for the past 2 hours and a temp of 100. Denies bowel changes, urinary symptoms.
Meds: none; Allergies: NKDA
What is going on with Don?
Appendicitis

- Inflammation/Infection of the Appendix
  - Can lead to ischemia and perforation of the appendix
- Etiology
  - Most common age: 10-19 years
  - Incidence: 1.1/1000 Persons each year
  - Males > females
  - Whites > Nonwhites
  - Summer - most common time of year
  - Midwest - highest incidence

- Mortality and morbidity rates remain high
- Perforation rates: 17-40%
  - Perforation has been known to occur within 1st 24-48 hours of the infection

History of a patient with appendicitis

- Careful history is the most important aspect
  - Individual is usually a teen or young adult
- Classic presentation: awakens in the night with vague periumbilical pain
  - Worsens over the period of 4 hours
  - Subsides as it migrates to the RLQ
  - Worsened with movement, deep respirations, coughing

- Pain precedes anorexia, nausea or vomiting
  - Nausea and anorexia are very common
  - Vomiting may or may not be present
  - Question the diagnosis if patient is hungry
- Low grade fever or none at all
- Usually seek attention within 12-48 hours
- Patient will often report feeling constipated

Clinical Pearl

The presence of pain before vomiting is highly suggestive of appendicitis.

Diarrhea before pain is more likely to be gastroenteritis.

Physical Examination

- Abdominal Examination
  - Tenderness at McBurney’s point
    - 1/3 the distance between the anterior iliac spine and the umbilicus
  - Guarding
    - Contraction of the abdominal walls
    - Frequently present
    - Can be faked or induced
Physical Examination
- Rigidity
  - Important predictor of appendicitis
  - Involuntary spasm of the abdominal musculature
  - Caused by peritoneal inflammation
- Markle’s sign
  - Heel-drop jarring test

Physical Examination
- Rovsing’s Sign
  - Pain felt in RLQ when examiner presses firmly in the LLQ and suddenly withdraws
- Psoas Sign
  - Patient is placed in a supine position
  - Ask patient to lift thigh against your hand that you have placed above the knee

Physical Examination
- Obturator Sign
  - May be or may not be positive
  - Patient is positioned in supine position with the right hip and knee flexed
  - Internally rotate the right leg
- Internal Examination
- Rectal Examination
  - This is essential to assist with the diagnosis

Laboratory/Radiologic Testing
- CBC with differential
  - Normal wbc count doesn’t rule-out the diagnosis
  - White blood cell count may actually decrease
  - Look for wbc left shift
    - Elevated wbc
    - Elevated neutrophils
    - Elevated bands

Laboratory/Radiologic Testing
- Urinalysis
- CT Scan
  - Within past 2 years, new focused appendiceal CT technique has been developed
  - Will decrease the laparoscopy rate
  - Ultrasound can still be performed; seems to be best for children and women of childbearing age

Shaun...
- Shaun is a 16 year old male who presents with a one week history of worsening abdominal pain located predominantly in the upper abdomen radiating through to the back. Worse with movement. Constant. Becoming progressively worse. Now associated with vomiting and diaphoresis. PE-BP 90/52; 80/50 sitting; Temp-100.8; Pulse 120; Abdomen-tender in LUQ and RUQ. No rebound.
  - What else do we need to know?
**Pancreatitis**

- **Etiology**
  - Often a history of alcohol abuse
  - Biliary tract disease
  - May have a history of hypertriglyceridemia (10%)

- **Symptoms**
  - Pain is severe and constant; lasting hours-days
  - Develops suddenly and becomes intense in minutes
  - Often radiates to the back (50%)
  - Vomiting is present
    - If not present, consider another diagnosis

**Symptoms**

- Pain is worsened by coughing and movement
- Sweating

- **Physical Examination**
  - Tachycardia
  - Postural Hypotension
  - Temperature of 100-101 degrees
  - Abdominal distension and tenderness
  - Tenderness predominantly in upper quadrants
  - Hypoactive bowel sounds

**Laboratory Findings and Diagnosis**

- Amylase: elevated mainly in pancreatic disease
- Lipase: good confirmatory test
- Leukocytosis
  - Typically 12,000 - 20,000
- Ultrasound
  - Detect a biliary obstruction caused by gallstones or edema of the pancreas
- CT scan
  - Best visualization of the pancreas

**Treatment**

- **Mild Pancreatitis**
  - Fasting state until decrease of signs and symptoms (usually within a few days)
  - Cessation of alcohol or correct problem
  - May need IV fluids

- **Moderate - Severe Pancreatitis**
  - Hospitalization

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**Shelley**

Shelley is a 17 yowf who presents with a 3 day history of vaginal bleeding. Positive pregnancy test in the office 4 days ago. Based upon dates, she is now 5 weeks pregnant. Complaining of LLQ ache and mild cramping. Bleeding has not changed since onset. Serum quant 2 days ago: 100; Today-110.

What should we do now?

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**Ectopic Pregnancy**

- **Ectopic**: pregnancy occurring outside of the uterus

- **Etiology**
  - Variety of locations of implantation
  - Average rupture time: 8-12 weeks
  - Most common cause of maternal mortality in the 1st trimester and 2nd leading cause of maternal mortality in the US
  - 1:100-200 pregnancies is ectopic
  - 4 fold increase in ectopic rates from 1970-89
Ectopic Pregnancy

- hCG is secreted by the developing trophoblast starting at day 8 of the pregnancy
- Should double every 36-48 hours
- By 6 weeks, the normal hCG is approximately 10,000
- Lack of doubling indicates an abnormal pregnancy

Clinical Pearl

The absence of an intrauterine sac on transvaginal ultrasound when the hCG is > 2000 is highly suggestive of an ectopic pregnancy

Ectopic Pregnancy

- The woman with an ectopic pregnancy will not have the normal doubling
- hCG does not go above 6000
- Progesterone levels are low
  - <5ng/ml
  - Normal pregnancy: >10ng/ml

Ectopic Pregnancy

- Symptoms
  - Asymptomatic
  - Majority have irregular bleeding
  - Abdominal pain occurs 3-5 weeks after the bleeding begins

Ectopic Pregnancy

- Physical Examination
  - Abdominal tenderness (LLQ or RLQ)
  - Uterine size (2/3 will have a normal uterine size)
  - 50% will have an adnexal mass palpable on physical examination

Diagnosis of an Ectopic

- Abdominal examination
- Pelvic examination
  - Caution: May cause a tubal rupture
- Urine hCG
  - Serum Quantitative hCG
- Serum progesterone
- Transvaginal ultrasound
Medical Management of an Ectopic Pregnancy

- 25% of all ectopic pregnancies can be managed medically
- 80-90% success rate
- 80% of individuals treated with MTX will become pregnant again; 11% ectopic
- Methotrexate injection
  - Conceptus < 3.5cm
  - Unruptured fallopian tube
  - hCG levels <1,500
  - No fetal heart activity

Case Study

- 17 year old woman presents with a 8+ year history of straining, hard/lumpy stools, and a sense of incomplete evacuation. She passes stool approximately 2 times per week.
- Upon further questioning, she also notes frequent bloating, moderate abdominal discomfort, and partial relief with defecation.
- She denies hematochezia, weight loss, family history of colon cancer, or inflammatory bowel disease.
- Rectal exam and abdominal exam are normal. CBC is normal.

What do you think is going on with her?

Does This Patient Have A Functional Bowel Disorder?

Definition of IBS

- American Gastroenterologic Association
  - A combination of chronic and recurrent GI symptoms not explained by a structural or biochemical abnormality.
  - Attributed to the intestines and associated with bloating, distension, pain which improves with defecation, and abnormal defecation.

Irritable Bowel Syndrome

- Symptom Types
  - Diarrhea predominant IBS (33%)
    - IBS-D
  - Constipation predominant IBS (33%)
    - IBS-C
  - Alternators
    - IBS – Mixed (33%)
      - Many individuals are thought to suffer from IBS - C predominantly but have occasional breakthrough diarrhea (It is often the diarrhea which brings them in for evaluation).
The Bristol Stool Form Scale

<table>
<thead>
<tr>
<th>THE BRISTOL STOOL FORM SCALE</th>
<th>SLOW TRANSIT</th>
<th>FAST TRANSIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Separate hard lumps, like nuts</td>
<td>Sausage-like but lumpy</td>
</tr>
<tr>
<td>Type 2</td>
<td>Like a sausage but with cracks in the surface</td>
<td>Soft blobs with clear-cut edges</td>
</tr>
<tr>
<td>Type 3</td>
<td>Like a sausage or snake, smooth and soft</td>
<td>Fluffy pieces with ragged edges, a mushy stool</td>
</tr>
<tr>
<td>Type 4</td>
<td>Watery, no solid pieces</td>
<td></td>
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<tr>
<td>Type 5</td>
<td></td>
<td></td>
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<tr>
<td>Type 6</td>
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<tr>
<td>Type 7</td>
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</table>


Chronic Constipation

Statistics on Chronic Constipation
- Estimated that chronic constipation affects 2% - 27% of all adults in North America
- Overall prevalence: 15% of population
- More common in women: 2-3:1 ratio
- Higher prevalence associated with lower socioeconomic status, age older than 65 years, and non-white race

An Evidence Based Approach to the Management of Chronic Constipation in North America. American J of Gastroenterology 2005;100;S1.

Pathophysiology of Functional Bowel Disorders

There Is Significant Overlap Among GI Motility and Sensory Disorders

- 29% of GERD and dyspepsia patients have chronic constipation
- Diagnoses can shift from one disorder to another over time
- Possible common pathophysiological mechanisms

Normal Bowel Activity Is Initiated by a Bolus Moving Through the Intestine

- The presence of a bolus in the intestine causes distortion of villi and distention of the intestine, resulting in signals being transmitted to afferent nerves within the intestinal wall via serotonin release.
- These signals result in proximal contraction and distal relaxation of muscles or peristalsis, and in transmission of sensory signals to the CNS.

Serotonin and Motor Activity in the Lower GI Tract

- Proximal
- Distal
- Movement of gut content

- Proximal Distal
- Motor neurons (relaxation)
- Interneurons (contraction)
- Motor neurons (relaxation)

Impaired 5-HT Release Leads to Impaired Enteric Reflexes, Dysmotility, and Altered Secretion

- Proximal
- Distal
- Altered Transit

- Motor neurons (contraction)
- Interneurons
- Motor neurons (relaxation)

- Impaired release of 5-HT

Pathophysiology

- Diarrhea and constipation are explained by the alteration in motor function.
- Abnormal pain experienced by patients with IBS is believed to be caused by excessive sensitivity to colonic distension.
  - Smaller amounts of distension causes more abdominal distress.

CC, IBS-C, and IBS-D Are Associated With Symptoms of GI Dysmotility and Altered Sensation

Symptoms of dysmotility are a result of impaired coordination of the muscles and nerves in the GI tract.

Symptoms of hypersensitivity or altered perception may be the result of alteration of ENS and/or CNS function.

fMRI Imaging with Rectal Distension in IBS

- Control (n = 18)
- IBS (n = 16)

- Anterior cingulate cortex (ACC)
- Ventral anterior thalamus (13V)
- Prefrontal cortex (PFC)

- Patients with IBS showed greater thalamic and ACC activation with painful distension than controls.
The Role of Stress in IBS
- Stress is widely believed to play a significant role in the pathophysiology and clinical presentation of IBS.
- Genetically predisposed individual.
- Sustained stress can result in a permanent increased stress response in the central stress circuits/pathways.

Role of Infection in IBS
- 7-30% of patients with newly diagnosed IBS have recently had a bacterial or viral gastroenteritis.
- Does infection cause an alteration in the number of enterochromaffin cells in the bowel - which causes an alteration in the amount of circulating 5-HT or is there bacterial overgrowth of the bowel?


Diagnosis of Functional Bowel Disorders

Rome III Diagnostic Criteria for Irritable Bowel Syndrome (all subtypes)
- At least 3 months, with onset at least 6 months previously of recurrent abdominal pain or discomfort (uncomfortable sensation not described as pain) associated with 2 or more of the following:
  - Improvement with defecation; and/or
  - Onset associated with a change in frequency or stool; and/or
  - Onset associated with a change in form (appearance) of stool


Diagnostic Criteria: Chronic Constipation
- Characterized by unsatisfactory defecation that results from:
  - Infrequent stools or
  - Difficult stool passage
- Characterized by: straining, sense of difficulty passing stool, incomplete evacuation, hard/lumpy stools, prolonged time to stool, or need for manual maneuvers to pass stool
- Or, a combination of both

Chronic Constipation and IBS-C Share GI Dysmotility Symptoms

CC and IBS-C lie along a spectrum of abdominal discomfort and pain
Diagnosis

- Because there are no biochemical or structural markers available to make an accurate diagnosis, history is the most important component.
  - Symptom analysis
  - Diagnostic tests in past
  - PMH and FH of GI diseases or autoimmune conditions
  - Dietary review
  - Meds, including OTC
  - What has been tried?

Red Flags

- Evaluate for alarm features
  - Reported weight loss
  - Nocturnal symptoms
  - Recent travel history
  - Family history of colon cancer or inflammatory bowel disease
  - Family history of Celiac disease
  - Onset in older patients (> 50)
  - Fevers
  - Oral ulcers
  - Bloody stools

ACG Evidence-Based Guideline: Diagnostic Testing

Chronic Constipation

- Among CC patient without alarm features, there are inadequate data to make a recommendation about the routine use of diagnostic tests.

Irritable Bowel Syndrome

- Among IBS patients without alarm features, the routine use of colonoscopy (<50 years old), flexible sigmoidoscopy, thyroid function tests, etc is not recommended.
- Routine testing for celiac disease may be considered.
- Individuals > 50 years should undergo colorectal cancer screening.

If You Decide On Further Evaluation, The Possible Tests Are…

- CBC with differential
  - Anemia (Crohn’s, colitis, celiac disease), Eosinophilia (parasites), leukocytosis (infection, IBD), Toxic granulation (inflammation)
- ESR and hs-CRP (high sensitivity-C Reactive Protein)
  - Inflammation
- Comprehensive Metabolic Panel
  - Abnormal chemistries (liver, kidney disease, K+ loss)
- Stool for occult blood
  - Inflammatory bowel disorders, Colon cancer

Laboratory Evaluation

- TSH
  - Hypothyroidism and hyperthyroidism
- Stools for O & P / C&S
  - Parasites, Giardia, Infectious etiology
  - Consider with an acute onset
- Stool for Clostridium Difficile
  - Recent antibiotics
- Lactose Breath Test
  - Present in up to 25% of the population
  - Often co-existent with IBS
  - Or…a low lactose diet trial x 2 weeks
Possible Additional Tests

- Celiac Disease Testing
  - 4.6% of individuals with IBS are likely to have this present; Compared with 0.25-0.5% of general population
  - Celiac Panel: Immunoglobulin A (IgA), anti-tissue transglutaminase (tTGA), and IgA anti-endomysial antibodies (AEA)

- Sigmoidoscopy vs. Colonoscopy
  - Positive occult blood test
  - Nocturnal awakenings
  - Colon cancer

Case Study

- 17 year old woman presents with an 8+ year history of straining, hard/lumpy stools, and a sense of incomplete evacuation. She passes stool approximately 2 times per week.
- Upon further questioning, she also notes frequent bloating, moderate abdominal discomfort, and partial relief with defecation.

What is her diagnosis?

Treatment Options for Functional Bowel Disorders

Non-pharmacologic Treatments

- Dietary modification
  - Given high incidence of concomitant lactose intolerance, dairy avoidance may be helpful
  - 2 week trial of a lactose free diet can be helpful
  - Lactaid or similar as an adjunct to dairy products

Pharmacologic Options

Non-pharmacologic Treatments

- Dietary modification
  - Avoid potential triggers: caffeine, alcohol, sorbitol, citrus fruits, high fiber foods, high fructose corn syrup
  - Gas producing foods (beer, cauliflower, grapes, onions, beans, brussel sprouts, plums, raisins, red wine)
  - High fiber foods may occasionally help some individuals but need to tailor to individual patient

Most Sufferers Have Tried Traditional Therapies and Report Dissatisfaction

<table>
<thead>
<tr>
<th>Agent</th>
<th>Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulking agents</td>
<td>Not more effective than placebo at relieving global IBS symptoms</td>
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<tr>
<td>Antispasmodics*</td>
<td>Insufficient data to make a recommendation about the efficacy of these agents in patients with IBS</td>
</tr>
<tr>
<td>Tricyclic antidepressants††</td>
<td>Not more effective than placebo at relieving global IBS symptoms. May worsen constipation</td>
</tr>
<tr>
<td>Tegaserod</td>
<td>Statistically significant improvements in symptoms of IBS-C</td>
</tr>
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ACG Evidence-Based Position Statement on the Management of IBS-C: Treatment Recommendations

Chronic Constipation: Treatment Recommendations

<table>
<thead>
<tr>
<th>Agent</th>
<th>Efficacy</th>
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<tbody>
<tr>
<td>Psyllium</td>
<td>Increases stool frequency in patients with CC</td>
</tr>
<tr>
<td>Calcium polycarbophil</td>
<td>Insufficient data</td>
</tr>
<tr>
<td>Tegaserod††</td>
<td>Statistically significant reduction in CC symptoms</td>
</tr>
<tr>
<td>Lubiprostone</td>
<td>Statistically significant reduction in CC symptoms</td>
</tr>
<tr>
<td>Stool softeners</td>
<td>Insufficient data; may be inferior to psyllium for improvement in stool frequency</td>
</tr>
<tr>
<td>Milk of magnesia†</td>
<td>Insufficient data</td>
</tr>
<tr>
<td>Stimulant laxatives</td>
<td>Insufficient data</td>
</tr>
<tr>
<td>Polyethylene glycol</td>
<td>Effective at improving stool frequency and stool consistency in patients with CC</td>
</tr>
</tbody>
</table>


Thank You

I Would Be Happy To Entertain Any Questions

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