

Chapter 11

A Diagnostic Approach to Chronic Abdominal Pain



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Case Study

A 50-year-old woman presents with a 2-year history of right upper quadrant pain. She describes it as constant and burning with no radiation. Exacerbating factors include sitting or lying on the right side, and she reports no alleviating factors. She denies any other gastrointestinal or systemic symptoms. She has a past medical history of hypertension and hyperlipidemia. She underwent cholecystectomy 3 years ago for biliary colic symptoms. Physical exam is notable for a scar in the right upper quadrant at the site of prior cholecystectomy. Palpation of the right upper quadrant elicits a focal area of tenderness that worsens when the

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patient is asked to raise both legs off the examination table. Prior laboratory tests, including complete blood count, electrolyte panel, liver biochemistries, and inflammatory markers, were all unremarkable. A right upper quadrant ultrasound and computed tomography abdomen performed within the last year were both normal without any abnormalities detected. She is becoming increasingly concerned and worried about her pain given its duration and the lack of a formal diagnosis. What is the most likely etiology of this patient's abdominal pain, and how would you manage this patient?

Objectives

- Categorize the broad differential diagnoses for chronic abdominal pain.
- Define a stepwise approach to the work-up of a patient with chronic abdominal pain.
- Review treatment options for unspecified chronic abdominal pain.

Epidemiology

Chronic abdominal pain is commonly encountered throughout medicine, especially in primary care and gastroenterology clinics. In fact, abdominal pain impacts close to 22% of the adult population, affecting slightly more women than men [1]. While there is no formal criterion regarding duration of symptoms that defines chronic abdominal pain, most experts agree that symptoms are generally present for at least 6 months [2, 3]. Chronic abdominal pain can affect patients of all age groups, ethnicities, and backgrounds, although women and those from lower socioeconomic groups are at higher risk. The symptoms can vary from one individual to another and range in intensity from mild with

no associated morbidity to severe with major limitations in daily activities.

The disease course and prognosis are variable and depend on the underlying etiology. Functional disorders associated with abdominal pain, including functional dyspepsia and irritable bowel syndrome (IBS), are present in approximately one-fourth of the general population [4]. In patients with symptoms secondary to functional gastrointestinal disorders, approximately 40% had no further symptoms, 20% had the same symptoms, and 40% had different symptoms at 1-year follow-up [5]. A frequently overlooked cause of chronic idiopathic abdominal pain is abdominal wall pain, which accounts for up to 10% of such cases [6]. Chronic abdominal pain can present a diagnostic challenge for clinicians given the broad differential it encompasses and frustration for patients who often have a negative diagnostic work-up and high healthcare costs. Also, there can be an unawareness of exam maneuvers to make specific diagnoses, such as abdominal wall pain. Chronic pain accounts for increased healthcare utilization, with a total financial cost of approximately \$600 billion annually, with a significant portion due to abdominal pain [7].

Etiology

Chronic abdominal pain has a wide array of underlying etiologies, including both organic and functional disorders. Organic disorders occur secondary to structural or physiologic causes, while functional disorders have no clear explanation.

The organic etiologies associated with chronic abdominal pain can be captured using a location-based approach, depending on whether the pain occurs predominantly in the right upper quadrant (RUQ), epigastric region, left upper quadrant (LUQ), or lower abdominal region (Fig. 11.1). The organs present in each of these regions help to narrow the

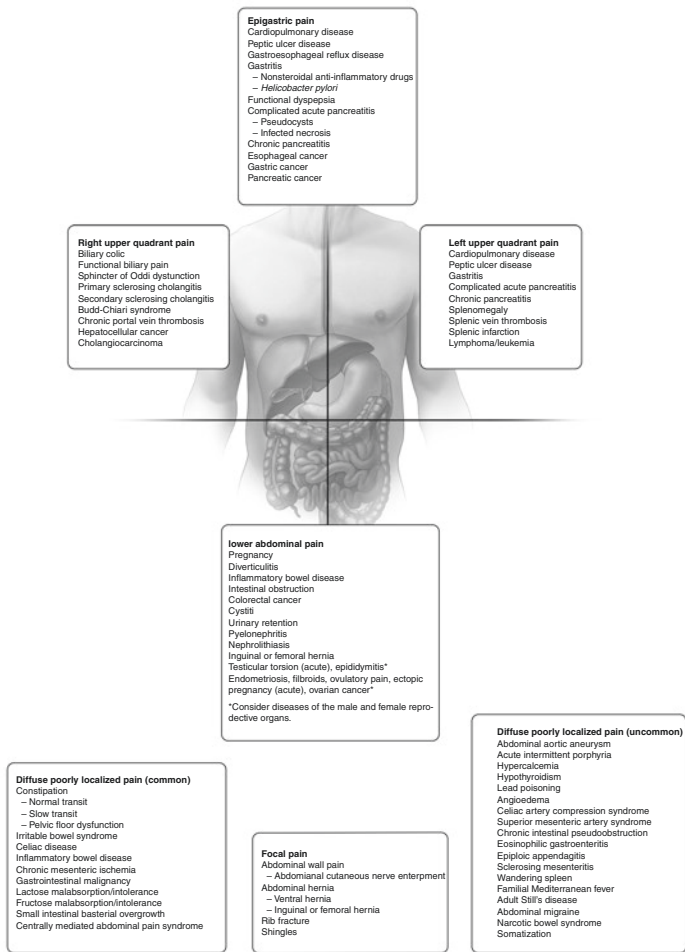


FIGURE 11.1 A location-and character-based approach to etiologies of chronic abdominal pain. (Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved)

differential diagnoses. Right upper quadrant pain is most commonly associated with liver, gallbladder, or biliary tree pathology. Epigastric and LUQ pain can occur secondary to disorders of the esophagus, stomach, duodenum, pancreas, or

spleen. In particular, it is important to exclude cardiopulmonary causes of epigastric or LUQ pain, as these can potentially be life-threatening. For example, angina pectoris can have an atypical presentation in women, the elderly, and those with diabetes. Lower abdominal pain may occur secondary to disorders of the small or large intestine, appendix, or genitourinary system. In women, the ovaries and uterus may be responsible for lower abdominal pain, while scrotal or inguinal pathology can cause similar pain in men.

Certain organic etiologies cannot be easily captured using a quadrant-based approach but, rather, can be considered using a character-based approach (focal vs. diffuse) (Fig. 11.1). Focal abdominal pain may occur secondary to musculoskeletal issues, nerve entrapment, or irritation of the parietal peritoneum. Diffuse abdominal pain has a broad differential and can occur secondary to inflammatory, ischemic, metabolic, neoplastic, or malabsorptive etiologies. In cases where the history, physical exam, and diagnostic testing reveal no obvious structural cause of abdominal pain, functional bowel disorders should be considered. The three most common functional disorders associated with abdominal pain include functional dyspepsia, IBS (constipation-predominant, diarrhea-predominant, and mixed-pattern subtypes), and functional abdominal pain syndrome [4]. New developments in our understanding of visceral and central pain led the Rome IV committee to change the term functional abdominal pain syndrome to centrally mediated abdominal pain syndrome (CAP), reflecting the importance of glial and nerve cells [3]. Other common functional bowel disorders include functional constipation, functional diarrhea, functional abdominal bloating, narcotic bowel syndrome, and opioid-induced constipation [8].

Pathophysiology

The pathophysiology of disorders that result in chronic abdominal pain is extensive and wide-ranging. Inflammation can occur throughout the gastrointestinal tract and can pres-

ent with chronic abdominal pain. Examples of inflammatory conditions include esophagitis due to gastroesophageal reflux disease (GERD), gastritis due to nonsteroidal anti-inflammatory drug (NSAID) use or *Helicobacter pylori* infection, eosinophilic gastroenteritis, chronic pancreatitis due to alcohol abuse, and enteritis or colitis due to inflammatory bowel disease (IBD). The gut microbiome plays a fundamental role in metabolism and immunity, and alterations in gut flora may play a part in various gastrointestinal disorders, including inflammatory conditions, malignancy, and functional bowel disorders [9–12]. Additionally, small intestinal bacterial overgrowth can occur when the normal enteric flora is disrupted, often due to reduced gastric acid production, altered small bowel anatomy, or small intestinal dysmotility [13]. Ischemia occurs when the blood flow to an organ becomes reduced, and patients with mesenteric ischemia are classically elderly with cardiovascular disease, or may occur in those with underlying thromboembolic or hypercoagulable conditions. Chronic mesenteric ischemia presents with postprandial pain, sitophobia, and weight loss and occurs when atherosclerosis is present in at least two of the three mesenteric vessels (celiac artery, superior mesenteric artery, and inferior mesenteric artery) [14]. Mechanical obstruction of the alimentary system, biliary tree, and urinary tract classically presents with acute abdominal pain; however, partial or intermittent obstruction can result in chronic or recurrent symptoms. Similarly, while perforation of gastrointestinal organs such as the stomach, small bowel, or colon typically presents with peritonitis and acute abdominal pain, smaller perforations may heal spontaneously and present with late complications, such as abscesses and fistulae. Medications can result in inflammation and injury (e.g., NSAIDs, bisphosphonates, doxycycline), altered bowel motility with constipation (e.g., opioids, antihistamines, calcium, iron supplements) or diarrhea (e.g., metformin, selective serotonin reuptake inhibitors, proton pump inhibitors, magnesium), and visceral hyperalgesia (opioids). Functional gastrointestinal disorders can be explained using a biopsychosocial model, which includes

genetic predisposition, psychological factors, gastrointestinal dysfunction, and central sensitization due to alterations in the brain-gut axis [4].

Symptoms

Chronic abdominal pain is often a nonspecific complaint that can involve discomfort anywhere from the lower chest to the pelvis. The quality, description, location, and radiation of the pain depend on the organ system(s) involved. While patients with chronic abdominal pain may present with isolated abdominal pain, they may also have other concomitant symptoms (Table 11.1). In patients with multiple symptoms, it is important to elucidate the most distressing symptom through a careful history, review of systems, and physical exam. Identifying the primary symptom can provide useful clues to the underlying diagnosis.

Cardiopulmonary causes (e.g., ischemia, pericarditis, pulmonary embolus) must be strongly considered and ruled out if chest pain and shortness of breath are present, especially if these are exertional or inspirational in nature. Alarm features suggestive of a serious underlying issue include fevers, unintentional weight loss, anemia, dysphagia, persistent vomiting, sudden change in bowel habits, hematemesis, melena, hematochezia, or a family history of gastrointestinal cancer. In particular, unintentional weight loss, especially greater than 10% of ideal body weight, should raise the suspicion for malignancy, particularly in elderly patients.

In many patients, abdominal pain can be associated with constipation or diarrhea. The Bristol stool form scale can help provide useful information regarding stool form and consistency [15]. Other patients may complain of bloating or a sensation of increased abdominal pressure with or without visible distention [16]. Heartburn, regurgitation, nausea, and chronic cough may be suggestive of GERD. Melena or black, tarry stool is indicative of an upper gastrointestinal bleed and may be a clue to peptic ulcer disease in the patient presenting

TABLE 11.1 Symptoms to assess in patients presenting with chronic abdominal pain

Constitutional symptoms

- Fevers, chills, night sweats
- Changes in weight (weight loss/gain)
- Malaise, anorexia
- Lymphadenopathy

Gastrointestinal symptoms

- Dysphagia, odynophagia
- Heartburn, reflux
- Belching, bloating, distention, flatulence
- Nausea, vomiting
- Changes in bowel habits (constipation, diarrhea)
- Change in bowel color (melena, hematochezia, clay-colored stools)

Non-gastrointestinal symptoms

- HEENT^a: Scleral icterus, oral ulcers, tongue swelling (glossitis)
- Endocrine: Heat/cold intolerance, polyuria, polydipsia, polyphagia, abnormal hair growth, nail changes
- Cardiovascular: Chest pain, palpitations, orthopnea, paroxysmal nocturnal dyspnea, lower extremity edema, claudication
- Pulmonary: Cough, shortness of breath, wheezing, hemoptysis
- Genitourinary: Dysuria, increased urinary frequency, nocturia, hematuria, tea-colored urine, testicular pain, urethral or vaginal discharge, vaginal bleeding, dyspareunia, dysmenorrhea, change in menses
- Musculoskeletal: Arthralgias, myalgias

TABLE 11.1 (continued)

Skin: Jaundice, rashes, tender nodules, necrotic/deep ulcers, cyanosis, pruritis
Neuropsychiatric: Headache, muscle weakness, ataxia, depression, anxiety

^aHEENT, head, eye, ear, nose, and throat

with epigastric pain, while hematochezia is more typical of lower gastrointestinal bleeding and may occur in those with abdominal pain due to ischemia or inflammation. Hepatomegaly, jaundice, scleral icterus, clay-colored stools, and tea-colored urine are suggestive of hepatobiliary or pancreatic pathology. Genitourinary disorders should be suspected in patients with dysuria, increased urinary frequency, hematuria, nocturia, or pain in the suprapubic, testicular, or flank regions. Patients with coexisting depression and anxiety are more likely to have a functional disorder compared to the normal population.

Diagnostic Evaluation

The diagnostic evaluation of a patient with chronic abdominal pain begins with a thorough history and comprehensive physical exam (Table 11.2). The history should focus on eliciting the pain description, quality, location, radiation, and intensity, along with exacerbating and alleviating factors. An exhaustive review of systems should be performed to identify concomitant symptoms (Table 11.1) as these may provide clues to the underlying diagnosis. The past medical, family, and social history can be useful in identifying risk factors for certain disorders. Given the chronicity of the pain, the clinician should review prior laboratory and imaging studies along with previous procedures in order to understand the work-up to date and to avoid repeating tests when possible. The physical exam should include a complete abdominal and

TABLE 11.2 Important history and physical exam elements to obtain in a patient presenting with chronic abdominal pain

I. History of present illness

- Onset, frequency, and duration (acute vs. chronic)
- Description and quality (sharp, dull, achy, stabbing, burning, pressure)
- Location and radiation
- Intensity (scale 1–10)
- Exacerbating and alleviating factors
- Previous episodes
- Relationship to food
- Bowel habits
- Review of symptoms (see Table 11.1)

II. Review medical and surgical history

- Past medical history (including gastrointestinal and cardiopulmonary diseases)
- Past surgical history (including previous abdominal surgeries)
- Prior procedures (endoscopy, colonoscopy, ERCP^a)
- Prior imaging studies (ultrasound, CT^b, MRI^c)
- Menstrual history (including last menstrual period)
- Psychosocial assessment (abuse, PTSD^d, depression, anxiety, somatization)

*III. Review medication list (including NSAIDs^e, immunosuppressive agents, narcotics)**IV. Review family history (including colon cancer, IBD^f, autoimmune disorders)**V. Review social history*

- Alcohol, tobacco, recreational drug use
 - Sexual history (history of STDs^g, new sexual partners)
-

TABLE 11.2 (continued)

Use of contraception
Dietary habits
<i>VI. Physical exam</i>
Vital signs (stable vs. unstable)
General appearance
Abdominal examination
Inspection (patient position, prior scars, skin changes)
Auscultation (bowel sounds)
Percussion (tympanic vs. dullness)
Palpation (tenderness, organomegaly, masses)
Specialized tests (Carnett's sign, Murphy's sign)
Rectal examination (fecal impaction, evidence of bleeding, features of pelvic floor dysfunction, masses)
Focused physical exam (including pelvic exam) as guided by patient history

^aERCP, endoscopic retrograde cholangiopancreatography

^bCT, computed tomography

^cMRI, magnetic resonance imaging

^dPTSD, post-traumatic stress disorder

^eNSAIDs, nonsteroidal anti-inflammatory drugs

^fIBD, inflammatory bowel disease

^gSTDs, sexually transmitted diseases

rectal exam. While auscultating for bowel sounds, gentle pressure may be applied to the stethoscope; classically, abdominal tenderness lessens in patients with functional bowel disorders when they become distracted, while the pain may worsen in those with structural bowel disorders. Carnett's sign (Fig. 11.2), a clinical test that can help identify abdominal wall pain, should be routinely performed in patients presenting with chronic abdominal pain that is focal in nature [17]. The remainder of the physical exam should be guided by the patient's history.

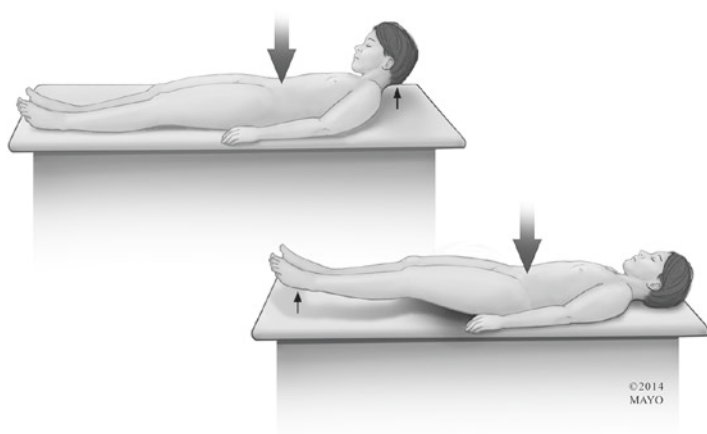


FIGURE 11.2 Carnett's sign can help identify abdominal wall pain. **Step 1:** The clinician identifies and palpates the point of maximal abdominal tenderness (resting supine position). **Step 2:** The patient raises both legs off the examination table (tense position) while the clinician palpates the abdomen. Alternatively, the patient can raise their head and shoulders off the bed, tensing the abdominal wall. **Positive Carnett's sign:** Palpation of abdominal muscles in the tense position elicits the same or more tenderness as the rest position → musculoskeletal source (abdominal wall pain). (Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved)

The next step in the evaluation of chronic abdominal pain consists of obtaining standard laboratory tests, as indicated (Fig. 11.2). For most patients, this may include some or all of the following: complete blood count, electrolyte panel, calcium, creatinine, liver biochemistries, lipase, C-reactive protein, and thyroid-stimulating hormone. IgA-tissue transglutaminase antibody should be considered in those with bloating, diarrhea, weight loss, or other manifestations of celiac disease. In women who are sexually active and of childbearing age, pregnancy should be ruled out. Patients younger than 60 years of age with dyspepsia and without alarm symptoms should be evaluated for *H. pylori* infection with a stool antigen or breath test [18]. In patients with microcytic

anemia, iron studies including iron, total iron binding capacity, and ferritin should be obtained. If IBD is suspected, fecal calprotectin may be helpful; the prevalence of IBD is less than 1% when the C-reactive protein and fecal calprotectin are low [4]. Patients with abdominal pain associated with nausea, hypotension, skin hyperpigmentation, hyponatremia, or hyperkalemia should have a morning cortisol level checked to rule out adrenal insufficiency. Additional laboratory testing should be guided by the history and physical exam.

If the testing above reveals an underlying etiology for the patient's symptoms, disease specific medical management should be initiated. However, if no underlying etiology is identified, patients should be stratified into low-risk and high-risk categories based on age and alarm features. Patients less than 60 years of age and without alarm features may be considered low-risk and should be offered empiric pharmacotherapy and/or psycho-behavioral therapy based on their principal symptom. Many low-risk patients may have a functional etiology of their chronic abdominal pain. Patients aged 60 years and older or with alarm features are more likely to have organic disease and may require additional evaluation. For both low-risk and high-risk patients, close follow-up is necessary to verify the diagnosis and assess treatment response.

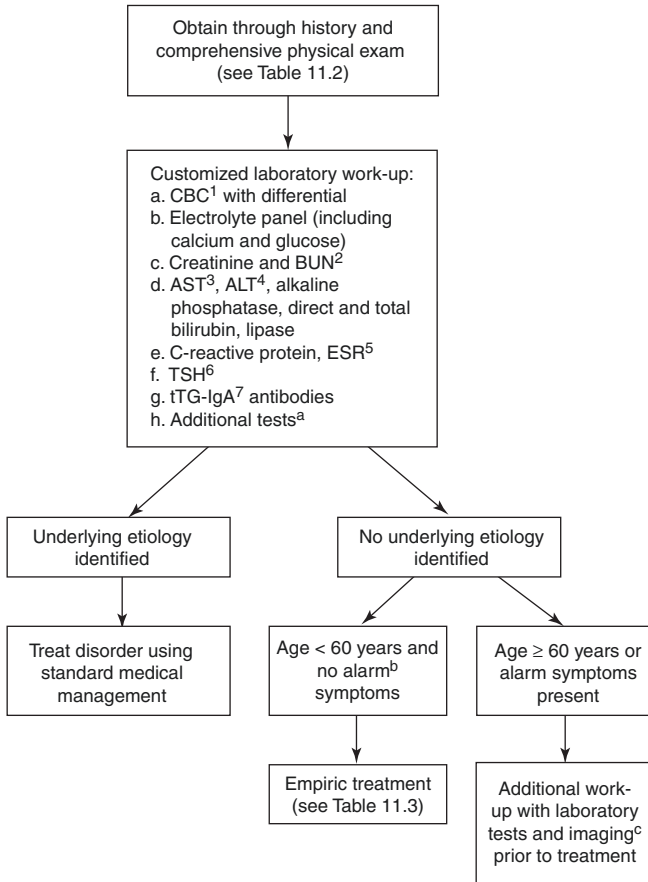
Ultrasound is the imaging modality of choice for RUQ pain to exclude gallstone-related disorders or biliary obstruction; Doppler evaluation can be added to assess the portal, hepatic, and mesenteric veins, as indicated [19]. A computed tomography of the abdomen (with or without pelvis) is the imaging modality of choice for evaluation of mid, diffuse, or lower abdominal pain when the diagnosis is unclear from the history, physical exam, and laboratory results. Oral contrast is used for bowel visualization, while IV contrast is used for visualization of vascular structures and solid organs [20]. In a pregnant patient, ultrasound and magnetic resonance imaging are the modalities of choice to minimize ionizing radiation exposure. An esophagogastroduodenoscopy should be performed when a patient presents with epigastric pain, heartburn, nausea/vomiting, dysphagia, or features of upper

GI bleeding, to allow for visualization of the esophagus, stomach, and duodenum. A colonoscopy may provide useful diagnostic information in the evaluation of chronic abdominal pain in the presence of lower GI bleeding, iron-deficiency anemia, chronic diarrhea, or new-onset constipation and should be offered to all patients who are due for colorectal cancer screening or surveillance [21].

Treatment

An effective patient-physician interaction is essential in the management of patients with chronic abdominal pain. Given the chronicity of symptoms, many patients are frustrated and unsatisfied with their health and healthcare providers. Therefore, it is essential to build a strong rapport with these patients in order to gain their trust and develop a therapeutic relationship. This not only improves compliance with recommended tests and treatments but also improves outcomes and patient satisfaction. Clinicians should approach patients with empathy and listen to their symptoms carefully. Even when a prior evaluation has been unrevealing or other providers have dismissed patient symptoms as functional or patients believe their abdominal pain is “all in their head,” clinicians should be systematic in their approach to avoid anchoring bias [22]. Instead, a diagnostic algorithm, as outlined in Fig. 11.3, should be followed.

The treatment of chronic abdominal pain also depends on whether an underlying etiology is found. When a specific cause is identified, it should be treated using standard medical management. For example, if a patient is found to have celiac disease, a gluten-free diet should be instituted. Similarly, if a patient is found to have *H. pylori* infection, she should be treated with appropriate therapy, and testing should be performed to confirm eradication [18]. Those with classic biliary colic or gallstone-related complications usually benefit from cholecystectomy. A trigger point injection may offer effective pain control for patients with abdominal wall pain [23].



¹CBC: Complete blood count; ²BUN: Blood urea nitrogen ³AST: Aspartate transaminase; ⁴ALT: Alanine transaminase; ⁵ESR: Erythrocyte sedimentation rate; ⁶TSH: Thyroid stimulating hormone; ⁷tTG-IgA: Tissue transglutaminase antibody.
^aAdditional tests should be obtained guided by patient history and physical exam and may include a pregnancy test, urinalysis, fecal calprotectin, *Helicobacter pylori* stool or breath test, glucose breath test, stool pathogen panel and ova/parasite exam, AM cortisol, Human immunodeficiency virus screen, and iron studies (iron, total iron binding capacity, and ferritin).
^bAlarm symptoms include fever, unintentional weight loss, dysphagia, persistent vomiting, sudden change in bowel habits, hematemesis, melena hematochezia, and family history of gastrointestinal cancer.
^cImaging modalities may include esophagogoduodenoscopy, colonoscopy, computed tomography, magnetic resonance imaging, or ultrasound.

FIGURE 11.3 Diagnostic algorithm to evaluate patients with chronic abdominal pain

If no underlying etiology can be identified, patients can be treated empirically with pharmacotherapy and/or psycho-behavioral counseling based on their principal symptom. Patients may benefit from dietary and medication modifications if these factors are felt to be causally related to the pain. Over-the-counter medications tailored to patient symptoms can be initiated (Table 11.3). Prescription medications, such as tricyclic antidepressants or other neuromodulating agents, may be required and can be used in conjunction with behavioral and/or psychological therapies, if necessary [4]. In general, serotonin-norepinephrine reuptake inhibitors are more effective than selective serotonin reuptake inhibitors for the treatment of chronic visceral pain [24]. Cognitive behavioral therapy (CBT) helps patients identify maladaptive thoughts and behaviors and is the most effective psychological therapy for functional abdominal pain [4]. Continued and escalating doses of opioids can lead to worsening abdominal pain and should be avoided. In refractory cases, a multidisciplinary pain management program that combines physical therapy, occupational therapy, and CBT can prove useful [4].

Case Study: Follow-Up

This patient's chronic abdominal pain was secondary to abdominal wall pain. As with our patient, other patients with abdominal wall pain may not have any abnormalities on laboratory or imaging studies. This diagnosis is primarily based on the physical exam, specifically Carnett's sign. With this examination technique, the clinician first palpates the area of maximal abdominal tenderness with the patient lying supine and relaxing the abdominal wall. The patient is then asked to lift both legs off the examination table or raise their upper torso in an "abdominal crunch," with both maneuvers designed to tense the abdominal wall muscles. Carnett's sign is considered positive when there is increased tenderness to palpation with tensing of the abdominal wall muscles and is strongly suggestive of abdominal wall pain. In contrast, those with visceral

TABLE 11.3 Treatment of unspecified chronic abdominal pain

I. Establish an effective and robust patient-physician relationship
Approach patient with empathy
Listen to the patient carefully to assess and understand their symptoms
Validate patient fears and concerns, when appropriate
II. Implement lifestyle changes, dietary modifications, and medication adjustments
III. Offer pharmacotherapy based on principal symptom or associated features
Constipation: Dietary fiber, osmotic laxatives, stimulant laxatives, secretagogues (e.g., lubiprostone, linaclotide, plecanatide), suppositories, or biofeedback
Diarrhea: Antidiarrheal agents (loperamide), anticholinergic agents, bile salt sequestrants (cholestyramine), probiotics
Gastroesophageal reflux: Antacids, H ₂ -receptor antagonists, PPIs ^a
Nausea and vomiting: Antihistamine agents (promethazine), serotonin 5-HT ₃ receptor antagonists (ondansetron), phenothiazines (prochlorperazine)
Dyspepsia: <i>Helicobacter pylori</i> eradication treatment, PPIs, TCAs ^b , prokinetics (metoclopramide), buspirone, FDgard
Delayed gastric emptying (gastroparesis): Prokinetics (metoclopramide), macrolide antibiotics (erythromycin, for acute episodes only), antiemetics
Depression or anxiety: Antidepressants (SNRIs ^c , SSRIs ^d , TCAs)
Visceral pain: Smooth muscle antispasmodics (dicyclomine), peppermint oil, antidepressants (SNRIs, SSRIs, TCAs)
Abdominal wall pain: Trigger point injection (local anesthetic +/- corticosteroids)

(continued)

TABLE 11.3 (continued)

Narcotic bowel syndrome: Stop narcotics and control withdrawal symptoms (clonidine, benzodiazepines, antidepressants)

IV. Offer psychological and behavioral interventions (cognitive behavioral therapy) based on symptoms, functional impairment, and psychological distress

V. If pain remains refractory, consider referral to a multidisciplinary pain rehabilitation program (physical and occupational therapy, cognitive behavioral therapy)

^aPPIs, proton pump inhibitors

^bTCA, tricyclic antidepressants

^cSNRIs, serotonin-norepinephrine reuptake inhibitors

^dSSRIs, selective serotonin reuptake inhibitors

abdominal pain have amelioration of their abdominal tenderness as the tensed musculature protects the abdominal viscera. The positive and negative likelihood ratios for Carnett's sign in the diagnosis of abdominal wall pain are 2.62 and 0.23, respectively [25]. This patient underwent a right upper quadrant trigger point injection with 2 ml of 1% lidocaine and 0.5 ml of betamethasone at the site of maximal tenderness, with dramatic improvement in her pain. At a follow-up visit 6 months later, she remained free of pain.

Clinical Pearls

- The diagnostic evaluation of a patient with chronic abdominal pain requires a thorough history, comprehensive physical exam, and individualized laboratory testing.
- If the diagnostic evaluation does not reveal an underlying etiology, patients should be stratified into low-risk and high-risk categories based on age and alarm symptoms.
- Carnett's sign is a physical exam maneuver that can identify abdominal wall pain and should be routinely

performed in the evaluation of patients with focal chronic abdominal pain.

- Low-risk patients (age <60 years and without alarm symptoms) may be treated empirically with pharmacotherapy and/or psycho-behavioral therapy based on their principal underlying symptom, whereas high-risk patients (age \geq 60 years or with alarm features) may require additional evaluation prior to treatment.

Self-Test

Question 1. A 40-year-old woman presents with a 4-year history of epigastric burning and fullness that typically occurs 1 hour after eating. She has a prior history of fibromyalgia and depression. Prior work-up, including an esophagogastroduodenoscopy, *Helicobacter pylori* stool antigen, and right upper quadrant ultrasound, have all been negative or normal. She denies any constipation, diarrhea, heartburn, or weight loss and has found no relief with over-the-counter antacid medications.

What is the most likely diagnosis?

- (a) Irritable bowel syndrome
- (b) Functional dyspepsia
- (c) Gastroesophageal reflux disease
- (d) Peptic ulcer disease
- (e) Biliary colic

Question 2. A 70-year-old man presents with a 4-month history of worsening abdominal pain. He notes that his abdominal pain starts within 30 min of eating and resolves over the next 2 hours. He has developed a fear of eating and has lost 15 pounds of weight during this time. He has a history of hypertension, hyperlipidemia, and 40-pack-year tobacco use. He denies a history of alcohol use. He underwent coronary

angiogram with drug-eluting stent placement to his left anterior descending artery 6 months ago for unstable angina. His medications include aspirin, clopidogrel, atorvastatin, metoprolol, and lisinopril. He denies diarrhea, melena, or hematochezia. A complete blood count and fasting glucose are within normal limits. An esophagogastroduodenoscopy was performed 6 months ago in the evaluation of nausea, around the time of his coronary angiogram, and was found to be normal.

What is the most likely diagnosis?

- (a) Gastric malignancy
- (b) Medication side effect
- (c) Chronic mesenteric ischemia
- (d) Chronic pancreatitis
- (e) Peptic ulcer disease

Question 3. A 61-year-old man presents with a 6-month history of epigastric pain. He describes the pain as burning and achy. It starts several hours after eating a meal and lasts for 1–2 hours. The pain also awakens him from sleep. He has lost 10 pounds of weight unintentionally during this time. He denies any melena or hematochezia. His past medical history is notable for osteoarthritis and benign prostatic hypertrophy. His only medications are over-the-counter analgesics for joint pain. His complete blood count reveals a microcytic anemia. His last colonoscopy at age 60 was unremarkable.

What is the next best step in management?

- (a) Computed tomography of the abdomen
- (b) Colonoscopy
- (c) Abdominal ultrasound
- (d) *Helicobacter pylori* stool antigen
- (e) Esophagogastroduodenoscopy

Question 4. A 30-year-old woman presents with a 3-year history of diffuse abdominal pain. She has a lifelong history of constipation with one bowel movement per week. She also describes a sense of incomplete evacuation, excessive strain-

ing, and occasional bloating. Several times per month, she has to manually evacuate stool using her fingers. She has seen two providers previously for the same complaint, and an esophagogastroduodenoscopy, colonoscopy, and computed tomography scan of the abdomen and pelvis have been unremarkable. She consumes 60 ounces of water daily and has found no benefit with fiber supplementation, which tends to worsen symptoms of chronic bloating. Her menstrual periods are regular, and her past medical history is unremarkable other than two uneventful vaginal deliveries. Abdominal examination reveals mild diffuse tenderness, and rectal examination reveals limited perineal descent and paradoxical contraction on simulated defecation, with hard stool palpable in the rectal vault.

What is the next best step in management?

- (a) Anorectal manometry with balloon expulsion
- (b) Increasing doses of stimulant laxatives
- (c) Defecating proctogram
- (d) Colonic transit study
- (e) Subtotal colectomy

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Essential Reading

- Bharucha AE, Chakraborty S, Sletten CD. Common functional gastroenterological disorders associated with abdominal pain. *Mayo Clin Proc*. 2016;91(8):1118–32. This article provides a comprehensive review of functional gastrointestinal disorders associated with abdominal pain.
- Lacy BE, Mearin F, Chang L, Chey WD, Lembo AJ, Simren M, et al. Bowel disorders. *Gastroenterology*. 2016;150(6):1393–407. This article also provides a comprehensive review of functional bowel disorders that includes their epidemiology, clinical evaluation, physiologic and psychosocial features, and treatment.
- Srinivasan R, Greenbaum DS. Chronic abdominal wall pain: a frequently overlooked problem. Practical approach to diagnosis and management. *Am J Gastroenterol*. 2002;97(4):824–30. This article discusses diagnosis and management of chronic abdominal wall pain.