

## Diagnostic approach to abdominal pain in adults

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**INTRODUCTION** — Abdominal pain can be a challenging complaint for both primary care and specialist physicians because it is frequently a benign complaint, but it can also herald serious acute pathology. Abdominal pain is present on questioning of 75 percent of otherwise healthy adolescent students [1] and in about half of all adults [2]. The prevalence of abdominal pain is consistently high across diverse geographic regions and age groups, and it is frequently a result of the irritable bowel syndrome [1-5].

From the large population of patients with benign causes of abdominal pain, clinicians are responsible for trying to determine which patients can be safely observed or treated symptomatically and which require further investigation or specialist referral. This task is complicated by the fact that abdominal pain is often a nonspecific complaint that presents with other symptoms [6]. Thus, the overall sensitivity and specificity of the history and physical examination in diagnosing the different causes of abdominal pain is poor [7], particularly for benign conditions [8,9]. Fortunately, studies of the accuracy of history and physical examination for the more serious causes of abdominal pain (eg, acute appendicitis), alone or in combination with focused investigations, have yielded better results [10-12].

**TRIAGE AND DISPOSITION** — Acute abdominal pain frequently requires urgent investigation and management. Some patients may require assessment of their airway, breathing, and circulation, followed by appropriate resuscitation. Many patients will require analgesics, which can be administered judiciously without compromising physical assessment of peritoneal signs [13-19].

Patients with suspected surgical abdomens must be transferred to an acute care facility where urgent surgical consultation and management are available. Patients requiring resuscitation or parenteral analgesia should also be transferred to an acute care facility where more appropriate nursing care and laboratory and radiology facilities are available. Patients with less acute illnesses may require consultation or referral for further management following a more detailed history and initial assessment, as described below.

Once the patient is stable, or while stability is being achieved, the differential diagnosis can be considered in terms of "symptom clusters" in order to guide further management and investigation.

**HISTORY** — Patients should first be asked about the time course of pain, both as part of the evaluation for a surgical abdomen and because once a surgical abdomen has been excluded the remainder of the evaluation will be guided by the chronicity of the symptoms along with the location of pain.

The history should include:

- Location of pain
- Radiation of pain
- Factors that exacerbate or improve symptoms such as food, antacids, exertion, defecation
- Associated symptoms including fevers, chills, weight loss or gain, nausea, vomiting, diarrhea, constipation, hematochezia, melena, jaundice, change in the color of urine or stool, change in the diameter of stool
- Past medical and surgical history, including risk factors for cardiovascular disease and details of previous abdominal surgeries
- Family history of bowel disorders
- Alcohol intake
- Intake of medications including over the counter medications such as [acetaminophen](#), aspirin, and NSAIDs
- Menstrual and contraceptive history in women

**PHYSICAL EXAMINATION** — The physical examination will vary depending upon the location and chronicity of the patient's symptoms. However, a typical examination will include:

- Measurement of blood pressure, pulse, and temperature
- Examination of the eyes and skin for jaundice
- Auscultation and percussion of the chest
- Auscultation of the abdomen for bowel sounds
- Palpation of the abdomen for masses, tenderness, and peritoneal signs
- Rectal examination including testing of stool for occult blood
- Pelvic examination in women with lower abdominal pain

**ACUTE VERSUS CHRONIC PAIN** — While an arbitrary interval, such as 12 weeks, can be used to separate acute from chronic abdominal pain, there is no strict time period that will classify the differential diagnosis unfailingly. A clinical judgment must be made that considers whether this is an accelerating process, one that has reached a plateau, or one that is longstanding but intermittent:

- Pain of less than a few days duration that has worsened progressively until the time of presentation is clearly "acute."

- Pain that has remained unchanged for months or years can be safely classified as chronic.
- Pain that does not clearly fit either category might be called subacute and requires consideration of the differential diagnoses for both acute and chronic pain.
- Pain in a sick or unstable patient should generally be managed as acute, since patients with chronic abdominal pain may present with an acute exacerbation of a chronic problem or a new and unrelated problem.

## ACUTE ABDOMINAL PAIN

Surgical abdomen — The first diagnoses that must be considered in patients with acute abdominal pain are those that may require urgent surgical intervention. The 'surgical abdomen' can be usefully defined as a condition with a rapidly worsening prognosis in the absence of surgical intervention [20]. Two syndromes that constitute urgent surgical referrals are obstruction and peritonitis. The latter encompasses most severe abdominal pathology since intraperitoneal hemorrhage or viscus perforation typically present with common features of peritonitis.

Patients with acute surgical abdomens will often have a rapid symptom evolution, but patients who have evolved from partial to complete bowel obstruction may present with weeks of vague abdominal pain, followed by a sudden deterioration. Pain is typically severe in all of these conditions, and it can be associated with unstable vital signs, fever, and dehydration.

Location and evolution of symptoms are helpful in narrowing the differential diagnosis, as in the classic evolution from visceral and periumbilical pain, to sharp right lower quadrant pain, in acute appendicitis. A particularly high level of suspicion should be maintained for severe pathology in immunosuppressed patients (including those taking immunosuppressive agents or having comorbidities affecting immune function, such as diabetes or renal failure) and the elderly, where classic signs of peritoneal inflammation may be attenuated.

Only after the clinician is satisfied that the abdominal presentation is not an acute surgical emergency can consideration of other diagnostic possibilities begin. Patients should not eat or drink while a diagnosis of a surgical abdomen remains under consideration.

Obstruction — Obstruction generally presents as pain together with anorexia, bloating, nausea, vomiting (which may be bilious or feculent depending on the level of obstruction), and obstipation.

Physical examination may reveal distension and high-pitched or absent bowel sounds. Abdominal percussion reveals tympany from proximally dilated loops of bowel. An abdominal mass, if present, may suggest an etiology for the obstruction.

Peritonitis — Patients with peritonitis of any cause tend to "look sick" and lie still to minimize their discomfort. They may receive little benefit from analgesics. Although rebound tenderness and its variants are classically thought to reflect peritonitis, abdominal wall rigidity and tenderness elicitable by percussion or very light palpation are also often overlooked features consistent with a surgical abdomen. Other subtle signs of peritonitis that can be pursued include diminished bowel sounds and pain worsened when an examiner lightly bumps the stretcher.

Initial diagnostic testing — Patients with a surgical abdomen should have the following laboratory measurements:

- Complete blood count with differential
- Electrolytes, BUN, creatinine, and glucose
- Aminotransferases, alkaline phosphatase, and bilirubin
- Lipase
- Urinalysis
- Pregnancy test in women of childbearing potential
- In the presence of fever or unstable vital signs, blood and urine cultures should be performed.

While these laboratory tests are important, they are not sufficient to rule in or rule out a diagnosis of surgical abdomen, as a surgical abdomen is a clinical diagnosis.

Abdominal radiographs (including a plain radiograph and an upright or lateral decubitus radiograph) are a crucial step in decision making for the suspected surgical abdomen, as proximally dilated loops of bowel are the hallmark of intestinal obstruction, and free intraperitoneal air can confirm a suspicion of hollow organ perforation. Peritonitis in the absence of perforation or obstruction may not yield any conclusive radiographic findings. Where CT scanning is immediately available and necessary for further evaluation, as described below, abdominal plain films are not necessary, as they do not provide additional information.

Subsequent diagnostic testing — Patients clearly in need of urgent surgical intervention may proceed directly to the operating room for diagnosis and management, and some patients will need no further preoperative assessment because of a clear history consistent with surgical disease such as appendicitis.

Many patients will not have a firm diagnosis after initial assessment, and in these cases, careful observation of the patient's course will be the most important factor in their management, since severe pathology typically becomes more obvious with time, and benign conditions may spontaneously improve. In addition to watchful waiting (which we consider to be an important diagnostic test), the following additional investigations can also be considered:

- In the case of suspected partial or complete intestinal obstruction, a CT scan of the abdomen is more sensitive and more likely to yield a diagnosis than plain abdominal radiographs [21]. All [barium](#) studies should be avoided in patients with suspected obstruction because they may result in retention of barium and interference with subsequent diagnostic tests. Intestinal pseudoobstruction should be suspected when signs and symptoms of obstruction are present, but distended bowel on radiography extends to the rectum. In these patients, a water-soluble contrast enema can safely rule out mechanical obstruction and potentially have a therapeutic effect.
- When clinical signs of peritonitis are present, but the etiology is not clear, an abdominal ultrasound is the test of choice, since it can effectively assess for appendicitis and abdominal abscess and obtains adequate views of intrapelvic pathology [23].
- Abdominal CT scan may be helpful as an alternative to ultrasound or in the clarification of equivocal ultrasound findings. In pregnant women with abdominal pain, ultrasound should be performed because it is not associated with radiation exposure or contrast, and pregnant patients may present with atypical history and physical findings of common pathologies [24].
- In some patients, surgical intervention should be considered even before confirmatory testing. Patients with a painful pulsatile abdominal mass, with or without bruit, should be suspected to have a ruptured aortic aneurysm. In unstable patients with suspected aneurysm rupture, surgical referral should not be delayed. In stable patients, abdominal ultrasound is the preferred investigation, although CT scanning is also acceptable.
- In patients presenting with less alarming symptoms, early laparoscopy has been considered as a potential cost-effective diagnostic and therapeutic strategy, when initial testing has not identified an etiology. In one randomized study of early laparoscopy and appendectomy for acute nonspecific abdominal pain in women, however, there was no difference in recurrence of abdominal pain over a 30 month follow-up period when women who had early laparoscopy were compared with control patients who received treatment based on findings from in-hospital observation [25].

Right upper quadrant pain — Pain involving the liver or biliary tree is generally located in the right upper quadrant, but it may radiate to the back or epigastrium. Because hepatic pain only results when the capsule of the liver is "stretched," most pain in the right upper quadrant is related to the biliary tree. Viral or drug-induced hepatitis can sometimes cause acute right upper quadrant pain as well.

Initial assessment of patients with right upper quadrant pain must consider serious causes and complications:

- The presence of fever and jaundice in a patient with right upper quadrant pain leads to a clinical diagnosis of ascending cholangitis, necessitating appropriate resuscitation, broad spectrum antibiotic therapy, and referral for consideration of invasive tests and treatments. Mild bilirubin elevations may not be appreciable clinically, so this diagnosis needs to be revisited if subsequent lab studies indicate an elevated bilirubin.
- Acute cholecystitis can also present as a systemically unwell patient with low-grade fever.
- Nonabdominal etiologies of upper abdominal pain must be considered.

Once these possibilities have been considered, the history can be explored in more detail. Since gallstones are such a common cause of relatively benign pain, as well as the serious complications mentioned above, the history for right upper quadrant pain focuses initially on risk factors for gallstone disease and previous episodes of similar pain.

Initial diagnostic testing — All patients with acute right upper quadrant pain should have the following laboratory measurements:

- Complete blood count with differential
- Electrolytes, BUN, creatinine, and glucose
- Aminotransferases, alkaline phosphatase, and bilirubin
- Lipase
- Plain films of the abdomen are unlikely to yield much information, so abdominal ultrasound is the test of choice for most patients, since its sensitivity for detecting gallstones and ability to measure biliary dilatation exceeds that of CT scanning. The main limitation of abdominal ultrasound in this setting is that it is often unable to visualize the distal common bile duct, which is hidden behind duodenal air. The diagnosis of distal biliary obstruction is therefore often made by the surrogate marker of ultrasonographic biliary dilatation.

Patients with an acute rise in aminotransferases and right upper quadrant pain most likely have choledocholithiasis, particularly if there is also an acute rise in bilirubin. Alkaline phosphatase does not rise for many hours after pain onset. Availability of

previous lab work is very helpful in this case, so that chronically elevated enzymes are not mistaken for a component of the acute presentation.

Patients with a classic presentation of choledocholithiasis may go directly for endoscopic retrograde cholangiopancreatography (ERCP), but an initial ultrasound may still be helpful in clarifying the diagnosis. (See "[Endoscopic balloon dilatation for removal of bile duct stones](#)".) When the right upper quadrant pain is vague, or associated with preceding flu-like illness or risk factors for viral hepatitis, the ultrasound can help by excluding biliary dilatation and revealing the inflamed liver parenchyma of acute hepatitis.

Subsequent diagnostic testing — Where available, endoscopic ultrasound can be performed before the more invasive endoscopic retrograde cholangiopancreatography (ERCP), in order to visualize the distal common bile duct. (See "[Endoscopic ultrasound in patients with suspected choledocholithiasis](#)".)

Magnetic resonance cholangiopancreatography (MRCP) is a noninvasive alternative to ERCP that has adequate sensitivity and might be reasonable when therapeutic intervention is not immediately necessary or in populations where ERCP may be of higher than usual risk [26]. MRCP is also appropriate in patients in whom the biliary tree may be endoscopically inaccessible, such as those who have undergone gastric bypass surgery or any Roux-en-Y surgical procedure,

Most cases of ascending cholangitis will require ERCP for both diagnosis and treatment, so patients in whom this diagnosis is considered should be referred to a facility with ERCP capacity as soon as possible after stabilization. (See "[Acute cholangitis](#)".)

Epigastric pain — Epigastric pain that is relatively sudden in onset is suggestive of pancreatitis, particularly when it radiates to the back and is associated with nausea, vomiting, and anorexia. (See "[Clinical manifestations and diagnosis of acute pancreatitis](#)".)

Since pancreatitis often occurs as a complication of gallstone disease, a patient with such a presentation should be questioned regarding any past or concurrent history of right upper quadrant pain. The other major risk factors for pancreatitis are alcohol use, trauma, and recent endoscopic retrograde cholangiopancreatography (ERCP). The patient's medications should be reviewed for an etiology of medication-induced pancreatitis. (See "[Etiology of acute pancreatitis](#)".)

Epigastric pain that is less acute is challenging to assess in an initial clinical encounter. Evidence suggests that physicians are unable to accurately diagnose specific etiologies of such pain based on history and physical examination [8,9,27]. Once pancreatic and hepatobiliary pain are excluded, pain limited to the epigastrium, which may be associated with bloating, abdominal fullness, heartburn, or nausea can be classified as dyspepsia.

Although physicians are typically taught that specific features of dyspepsia indicate its etiology (eg, ulcers improve with eating, positional changes precipitate

gastroesophageal reflux), controversy exists as to whether dyspepsia can be usefully categorized based on history alone. Given this, in the evaluation of acute epigastric pain, it is most useful to define which patients with dyspepsia require further investigation and which can safely undergo a therapeutic trial or watchful waiting [9,28,29]. Alarm features that suggest a need for further investigation include (see "[Approach to the patient with dyspepsia](#)", section on 'Alarm symptoms'):

Age over 50

Weight loss

Persistent vomiting

Dysphagia

Anemia

Hematemesis

Palpable abdominal mass

Family history of upper gastrointestinal carcinoma

Previously identified pathology requiring reassessment, or history of gastric surgery for pathology that could recur

The acuity and severity of the presentation will dictate the urgency of referral.

Nonabdominal etiologies of upper abdominal pain — Upper abdominal pain should always be considered a possible extension of cardiac pain, since myocardial infarction can present with referred pain. Patients should be asked about exertional symptoms or shortness of breath, and patients suspected of having an acute coronary syndrome should be referred for urgent evaluation and management. (See "[Criteria for the diagnosis of acute myocardial infarction](#)".)

Upper abdominal pain can also reflect pleural or pulmonary pathology when it arises in the lower thorax. Lower lobe pulmonary pathologies (eg, pneumonia, pulmonary embolism) or inflammatory pleural effusions (eg, empyema, pulmonary infarction) can present with what appears to be abdominal pain because they occur at the threshold of the abdomen. These can generally be excluded with a careful history and physical examination of the chest for percussion dullness, abnormal breath sounds, signs of consolidation, or a pleural rub. Chest radiographs can help exclude many thoracic pathologies.

Diagnostic testing for pancreatitis — Patients with a history suggestive of pancreatitis should have the following laboratory measurements:

Complete blood count with differential

Electrolytes, BUN, creatinine, and glucose

Aminotransferases, alkaline phosphatase, and bilirubin

Lipase (amylase is a less specific alternative, where lipase is not available [30])

Elevation of serum lipase in the presence of epigastric pain is very suggestive of pancreatitis. The differential diagnosis is limited but includes other processes, like malignancy, that involve the pancreas.



The initial workup of pancreatitis will usually involve an abdominal ultrasound to exclude gallstones, although CT scanning is more sensitive for the diagnosis of pancreatitis. Patients with chronic pancreatitis may present with exacerbations suggestive of recurrent acute pancreatitis. These patients may not exhibit impressive rises in lipase or amylase, so if risk factors for chronic pancreatitis are present, especially heavy alcohol use, or if the patient has steatorrhea, imaging with CT or ultrasound may play a crucial role in diagnosis. (See "[Clinical manifestations and diagnosis of acute pancreatitis](#)".)

A biliary etiology (ie gallstone-related) for pancreatitis should be suspected, even in the absence of ultrasound findings, in patients with elevated transaminases and pancreatitis. These patients should be investigated with ERCP [31]. In equivocal cases, MRCP or endoscopic ultrasound can be considered, as described above. (See '[Subsequent diagnostic testing](#)' above.)

Diagnostic testing for dyspepsia — Patients with dyspepsia and alarm symptoms (see '[Epigastric pain](#)' above) should generally be investigated with gastroscopy. Gastroscopy is preferred to [barium](#) swallow for the evaluation of reflux esophagitis, peptic ulcer disease, gastric and esophageal cancer, because of potential for obtaining biopsies and higher sensitivity in some situations [32-35]. (See "[Approach to the patient with dyspepsia](#)".) Patients younger than 45 to 50 years without any alarm symptoms can be managed with a therapeutic trial of antisecretory therapy without further investigation. Some experts recommend testing for *Helicobacter pylori* in such patients. The American Gastroenterological Association (AGA) technical review for the evaluation of dyspepsia [36], as well as other AGA guidelines, can be accessed through the AGA web site at <http://www.gastro.org/practice/medical-position-statements>.

Patients unresponsive to a therapeutic trial of antisecretory medication, or with alarm symptoms and a negative gastroscopy, might benefit from abdominal ultrasonography and a reassessment of whether they may have pancreatic or biliary pathology with a predominantly epigastric presentation. Repeating transaminases on multiple occasions will help identify patients with intermittent biliary pain. (See "[Pathogenesis, clinical features, and diagnosis of acute cholecystitis](#)" and "[Clinical manifestations and diagnosis of acute pancreatitis](#)" and "[Clinical manifestations and diagnosis of sphincter of Oddi dysfunction](#)".)

Lower abdominal pain — Pain in the lower abdomen can be associated with the distal intestinal tract, but it may also radiate down from upper abdominal structures or up from the pelvis. Features most suggestive of a colonic or ileal source include diarrhea or hematochezia and rectal symptoms such as urgency and tenesmus.

Left and/or right lower quadrant pain, when occurring together with diarrhea, are suggestive of colitis and/or ileitis, which may be infectious, ischemic, medication-associated, or due to inflammatory bowel disease. Diverticulitis presents more frequently as left lower quadrant pain than right lower quadrant pain. (See "[Clinical](#)

[manifestations and diagnosis of colonic diverticular disease](#)" and "[Clinical manifestations, diagnosis and prognosis of Crohn's disease in adults](#)".)

The history should include risk factors for infectious and ischemic causes, any history of NSAID use, and risk factors for inflammatory bowel disease (IBD). (See "[Definition of and risk factors for inflammatory bowel disease](#)".) Patients should be asked about, and examined for, extraintestinal manifestations of IBD such as iritis, erythema nodosum, clubbing, aphthous ulcers of the mouth, or perianal disease. (See "[Clinical manifestations, diagnosis, and prognosis of ulcerative colitis in adults](#)" and "[Clinical manifestations, diagnosis and prognosis of Crohn's disease in adults](#)".) Patients should be asked about urinary symptoms such as frequency, urgency, and dysuria.

In older patients, a similar presentation to that of IBD, with abdominal pain and a change in bowel habits, can be the first sign of colon cancer. Presentations of colonic neoplasia are highly variable, so risk factors for colon cancer (particularly age and family history) should be considered in patients with lower abdominal pain. (See "[Clinical manifestations, diagnosis, and staging of colorectal cancer](#)".)

Nonabdominal etiologies of lower abdominal pain — Lower abdominal pain can reflect retroperitoneal pathology. Renal colic results in pain that may begin in the flank and migrate through the abdomen to the groin, testes, or labia. Depending on the site of ureteric obstruction, it may mimic an acute abdomen. CT scanning can effectively diagnose kidney stones and guide management. (See "[Diagnosis and acute management of suspected nephrolithiasis in adults](#)".) Cystitis from a urinary tract infection can also produce lower abdominal (particularly suprapubic) pain. (See "[Acute uncomplicated cystitis and pyelonephritis in women](#)".)

Lower abdominal pain (pelvic pain) in women is frequently caused by disorders of the female reproductive organs. (See '[Lower abdominal pain in women](#)' below.)

Diagnostic testing — Laboratory evaluation in a patient with lower abdominal pain should include a complete blood count. Older patients found to have anemia should have iron studies; iron-deficiency anemia in the elderly is highly suspicious for gastrointestinal malignancy. A pregnancy test should be performed in women of childbearing potential, even when pregnancy is felt to be unlikely.

Patients with lower abdominal pain associated with diarrhea will often have self-limited presentations and can be managed expectantly, if clear risk factors for infectious diarrhea are present or if their presentation remains mild and limited to less than one week of symptoms. Patients with more severe or persistent presentations, and immunosuppressed patients, should have stool sent for culture for enteric pathogens, microscopy for ova and parasites, and measurement of Clostridium difficile toxin.

Patients with illness exceeding two weeks with negative cultures, systemically unwell patients, and immunosuppressed patients, will often require investigation with colonoscopy or flexible sigmoidoscopy to clarify the diagnosis and tailor therapy.

Patients presenting with predominantly diarrheal illnesses (rather than prominent

abdominal pain) are discussed in detail separately. (See ["Approach to the adult with acute diarrhea in developed countries"](#).)

Ileal pathology may present with acute or subacute diarrhea, right lower quadrant mass or pain, and weight loss or fever. When ileal pathology is suspected, the terminal ileum can be visualized by small bowel follow-through, as well as by [barium](#) enema, but colonoscopy has the advantage of allowing biopsies.

Acute left lower quadrant pain with fever and elevated white blood cell count is suggestive of diverticulitis. Diverticulitis can also present as right lower quadrant pain. Patients suspected of having diverticulitis should undergo an abdominal CT scan to assist in diagnosis [37]. (See ["Clinical manifestations and diagnosis of colonic diverticular disease"](#).)

Lower abdominal pain in women — Lower abdominal pain in women must be considered as a spectrum with causes of pelvic pain. Additional history should focus on the regularity and timing of menstrual periods, possibility of pregnancy, and presence of vaginal discharge or bleeding. A recent history of dyspareunia or dysmenorrhea is also suggestive of pelvic pathology. (See ["Approach to the woman with sexual pain"](#) and ["Pathogenesis, clinical manifestations, and diagnosis of primary dysmenorrhea in adult women"](#).)

In addition to the causes of lower abdominal pain discussed above (see '[Lower abdominal pain](#)' above), the most common etiologies of acute lower abdominal pain in women include: pelvic inflammatory disease (PID); adnexal cysts or masses with bleeding, torsion, or rupture; ectopic pregnancy; and uterine pain due to infection (endometritis) or due to degeneration, infarction, or torsion of leiomyomas.

A pelvic examination is part of the physical examination whenever pelvic pathology is in the differential diagnosis. (See ["The gynecologic history and pelvic examination"](#).)

The size and symmetry of the uterus are determined; symmetrical enlargement suggests intrauterine pregnancy (or adenomyosis), while irregular enlargement is more indicative of leiomyomas, although asymmetric enlargement can also be caused by bowel or adnexal masses adherent to the uterus. The normal uterus is not tender; the presence of uterine pain suggests infection or pathology related to leiomyomas (torsion, degeneration, infarction).

The adnexal areas are checked for the presence of appropriately sized, mobile ovaries (eg, about 2 by 3 cm), which are normally mildly tender upon compression. Ovarian masses both enlarge the ovary and make it more globular. Ovarian neoplasms and ectopic pregnancies are generally not painful unless bleeding, ruptured, or torsed, in which case pelvic pain is aggravated by coitus or bimanual examination of the adnexae. A fixed, painful adnexal mass is suggestive of an endometrioma or tuboovarian abscess. (See ["Overview of the evaluation and management of adnexal masses"](#) and ["Differential diagnosis of the adnexal mass"](#).)

Severe pain elicited by cervical movement and palpation of the adnexae suggests pelvic peritonitis from PID. Adnexal masses are not typically present unless there are tuboovarian abscesses or hydrosalpinges.

One or more of the following is suggestive of endometriosis: localized tenderness in the cul-de-sac or uterosacral ligaments; palpable tender nodules in the cul-de-sac, uterosacral ligaments, or rectovaginal septum; pain with uterine movement; tender, enlarged adnexal masses; or fixation of adnexa or uterus in a retroverted position.

(See "[Pathogenesis, clinical features, and diagnosis of endometriosis](#)".)

Diagnostic testing — Women with lower abdominal pain should have the following initial diagnostic tests:

Complete blood count with differential

Quantitative pregnancy test in women of childbearing potential

Microscopic exam in saline (wet mount) of any abnormal vaginal discharge

Tests for chlamydia and gonococcus in women with risk factors for sexually transmitted infections, mucopurulent cervical discharge, or suspected PID

Urinalysis (and urine culture if urinalysis shows leukocytes)

PID should be considered when acute left, right, or bilateral abdominal pain is accompanied by fever and an elevated white blood count with left shift. A purulent cervical discharge may be present. (See "[Clinical features and diagnosis of pelvic inflammatory disease](#)".)

Infarction or torsion of ovarian cysts and uterine leiomyomas is often accompanied by fever and leukocytosis as well, but usually the elevations are lower than those seen with PID. Abnormal vaginal discharge is typically not observed. (See "[Overview of the evaluation and management of adnexal masses](#)" and "[Differential diagnosis of the adnexal mass](#)" and "[Epidemiology, clinical manifestations, diagnosis, and natural history of uterine leiomyomas \(fibroids\)](#)".)

Abdominal pain, menstrual cycle abnormalities (missed or late menstrual period), and vaginal bleeding are the classic symptoms of ectopic pregnancy. Clinical manifestations typically appear six to eight weeks after a missed menstrual period, but they can occur later. A sensitive test for human chorionic gonadotropin will always be positive.

However, an intrauterine pregnancy may coexist with any of the causes of abdominal pain described above and give rise to these same findings. (See "[Clinical manifestations, diagnosis, and management of ectopic pregnancy](#)".)

Women with a positive pregnancy test and those in whom the diagnosis remains unclear after physical examination and the above tests generally require a pelvic ultrasound examination. Leiomyomas, adnexal masses, and intrauterine pregnancy can generally be visualized on and evaluated by pelvic ultrasound. Fluid in the cul-de-sac is suggestive of a ruptured ovarian cyst or ectopic pregnancy. Sonography is often normal with infection, but it may reveal accumulation of fluid and debris in the uterine cavity or thickened, fluid-filled oviducts with or without free pelvic fluid.

Generalized abdominal pain — Any patient presenting with severe generalized abdominal pain should be aggressively evaluated for a surgical abdomen. (See '[Surgical abdomen](#)' above.) The evaluation should only proceed once a process requiring acute surgery has been excluded.

Among the conditions that may require urgent surgical management, yet present without clear peritoneal findings, is acute mesenteric ischemia/mesenteric infarction. If clinically reasonable, the diagnosis of mesenteric ischemia should be entertained, particularly if the patient has the classic finding of pain out of proportion to physical findings or risk factors such as congestive heart failure, recent myocardial infarction, hypotension, hypovolemia, sepsis, cardiac surgery, or requirement for dialysis [38-41]. (See "[Acute mesenteric ischemia](#)".) Mesenteric ischemia might also be considered in the differential diagnosis of young persons with a known personal or family history of hypercoagulable state or venous thrombosis [38].

Generalized abdominal pain with vomiting and/or diarrhea, alone or in association with systemic symptoms, can represent an acute self-limited illness, such as viral or bacterial enteritis or colitis, or toxin-mediated food poisoning. Recently consumed meals that may have been inadequately cooked or improperly stored can offer clues to a source of illness: toxin-mediated illnesses can occur within hours of ingestion, but bacterial colitis generally requires 24 to 48 hours to develop. (See "[Differential diagnosis of microbial foodborne disease](#)".) Multisystem symptoms, such as upper respiratory tract involvement or myalgias, may suggest a viral etiology. A history of family members or other contacts developing a similar illness is valuable, not only because it points towards a likely diagnosis, but because the patient's illness is likely to mimic the course of their contact's. Depending on their degree of systemic illness, patients with self-limited symptoms may need only reassurance or may require significant supportive care. Diffuse abdominal pain can also be a nonspecific symptom of underlying metabolic disease. The presence of systemic illness, fatigue, weakness, nausea, flu-like symptoms, or signs and symptoms of endocrinopathies that are associated with abdominal pain should signal a search for metabolic abnormalities. Many of these conditions are fairly indolent or undiagnosed until triggered by an acute precipitant, such as infection, dehydration, surgical stress, or alcohol or drug use. Examples include diabetic ketoacidosis and Addison's disease. The abdominal pain will typically be diffuse and nonprogressive, without focal tenderness or other peritoneal features. It may be associated with unstable vital signs or fever, depending on its underlying cause. Diagnostic testing — In patients with symptoms suggestive of an acute infectious gastroenteritis or toxin-mediated food poisoning, the most useful diagnostic tool will often be watchful waiting for spontaneous recovery.

Patients in whom a metabolic etiology of abdominal pain is suspected should have the following laboratory measurements:

Electrolytes, with calculation of an anion gap

BUN, creatinine, blood glucose

Calcium

Complete blood count with differential

Further investigation for metabolic causes beyond initial lab work is tailored to abnormalities found on these initial tests. The combination of metabolic acidosis and an elevated blood glucose strongly suggests diabetic ketoacidosis (DKA) as the etiology of the symptoms; however, it is important to keep in mind that an intra-abdominal infection could precipitate DKA in a patient with diabetes. (See ["Clinical features and diagnosis of diabetic ketoacidosis and hyperosmolar hyperglycemic state in adults"](#).)

Adrenal insufficiency should be considered in patients with hyponatremia or hyperkalemia. (See ["Clinical manifestations of adrenal insufficiency in adults"](#).)

Hypercalcemia can cause abdominal pain, either directly or as an etiology for pancreatitis or constipation. (See ["Clinical manifestations of hypercalcemia"](#).)

Hypothyroidism and hyperthyroidism can occasionally cause abdominal pain, and so measurement of thyroid stimulating hormone may be appropriate in patients with other suggestive symptoms or in elderly patients with vague complaints.

There may be evidence for hematologic etiologies of generalized abdominal pain, such as severe hemolysis, sickle cell anemia, and acute leukemia on the complete blood count and differential. Even quite unusual causes may have hallmarks, like the microcytic anemia of lead toxicity, which suggests the need for a blood lead level.

(See ["Adult lead poisoning"](#).) Severe intermittent crises of abdominal pain can occur with porphyrias and sickle cell anemia, particularly after an acute precipitant, such as dehydration. (See ["Overview of the clinical manifestations of sickle cell disease"](#) and ["Porphyrias: An overview"](#).)

Patients with suspected acute mesenteric ischemia will generally require an imaging procedure for diagnosis. (See ["Acute mesenteric ischemia"](#).)

**CHRONIC ABDOMINAL PAIN** — Chronic abdominal pain is a common complaint, and the vast majority of patients will have a functional disorder, most commonly the irritable bowel syndrome [42,43]. Initial workup is therefore focused on differentiating benign functional illness from organic pathology. The evaluation of chronic lower abdominal pain (pelvic pain) in women is discussed separately. (See ["Causes of chronic pelvic pain in women"](#).)

The history should determine the overall time course of the illness, and it should differentiate pain that is fairly constant from pain that is chronic and intermittent. While the hallmark of irritable bowel syndrome is pain associated with changes in bowel habit, other related functional disorders may present with isolated pain (such as functional abdominal pain syndrome) or with pain mimicking upper gastrointestinal organic pathology (such as functional dyspepsia). (See ["Clinical manifestations and diagnosis of irritable bowel syndrome"](#) and ["Functional dyspepsia"](#).) A history of recurrent

pancreatitis or excessive alcohol intake should raise suspicion for chronic pancreatitis. (See "[Clinical manifestations and diagnosis of chronic pancreatitis in adults](#)".)

Features that suggest organic illness include unstable vital signs, weight loss, fever, dehydration, electrolyte abnormalities, symptoms or signs of gastrointestinal blood loss, anemia, or signs of malnutrition.

The bowel habit is an important part of the history for chronic abdominal pain. While many organic lesions can result in chronic diarrhea, irritable bowel syndrome often presents with swings between diarrhea and constipation, a pattern that is much less likely with organic disease.

The clinician must be alert to the common patterns of presentation in functional abdominal pain. Patients often describe their pain in unusual and dramatic fashion, and they may describe very longstanding pain as having particular urgency at the time of the physician encounter. Unrealistic expectations are common, and patients may demand immediate relief from a problem that has bothered them for years [44].

Physical examination must be complete, since many multisystem illnesses could contribute to a nonspecific abdominal complaint. Specifically, the physical examination should clarify any focus of abdominal tenderness that may merit and focus further investigation. Weight should be followed over time, and evidence of dehydration (such as orthostatic changes in vital signs) should be sought. Focal pain that worsens when the patient flexes their abdominal muscles is suggestive of abdominal wall pain.

(See "[Chronic abdominal wall pain](#)".)

Initial diagnostic testing — The following laboratory measurements should be performed in most patients with chronic abdominal pain:

Complete blood count with differential

Electrolytes, BUN, creatinine, and glucose

Calcium

Aminotransferases, alkaline phosphatase, and bilirubin

Lipase

Ferritin

Anti- tissue transglutaminase

A complete blood count can reveal anemia or an elevated white blood cell count, and it will occasionally demonstrate elevated platelet counts that may be associated with iron deficiency or inflammation [45]. A low ferritin suggests iron deficiency, which should raise the suspicion of celiac disease or inflammatory bowel disease. The above studies should be normal in patients with functional abdominal pain.

Abdominal pain is not a common presentation of hyper- or hypothyroidism, but when additional symptoms suggest abnormalities of thyroid function, a thyroid stimulating hormone (TSH) should be measured.

Patients with puzzling chronic abdominal pain should have a measurement of antibodies associated with celiac disease (see "[Diagnosis of celiac disease](#)", section on 'Summary

[and recommendations'](#)), since this is a treatable etiology of abdominal pain that may present at any age [46]. C-reactive protein and ESR are sensitive but nonspecific markers that may suggest the presence of occult organic disease and that have some utility in ruling out organic causes of chronic abdominal pain and diarrhea [47].

Subsequent diagnostic testing — At the conclusion of the initial workup, young patients with no evidence of organic disease can be treated symptomatically. The use of further invasive testing should be directed at ruling in or out specific diseases and not as a general screen.

Although patients with apparently functional abdominal pain have normal investigations and a benign prognosis, they often respond with dissatisfaction and distrust towards physicians who tell them that "nothing is wrong." Functional bowel diseases are associated with diminished quality of life, work loss, and morbidity, and patients deserve attentive trials of therapy as described elsewhere. (See "[Treatment of irritable bowel syndrome](#)" and "[Functional dyspepsia](#)".)

Conversely, a diagnosis of new-onset functional illness should be made only with great caution in patients over 50 years of age. These patients, by virtue of their increased risk of malignancy, will likely require abdominal imaging with ultrasound or CT and upper gastrointestinal tract endoscopy and/or colonoscopy as their symptoms and signs dictate. Many patients in this age group should have colonoscopy performed for screening purposes independent of symptoms, if this has not been performed previously. (See "[Screening for colorectal cancer: Strategies in patients at average risk](#)".)

Some patients have a history of pain that is likely organic, based on historical features or laboratory abnormalities, but may be difficult to definitively diagnose because the symptoms are intermittent. Examples of such cases include:

Right upper quadrant pain after cholecystectomy that mimics biliary colic and could be functional biliary pain; it could also arise from intermittent passage of stones that have formed in the bile ducts, passage of sludge, or sphincter of Oddi dysfunction. Transient elevation of liver enzymes or common bile duct dilatation on ultrasound help to define a subgroup of patients that are likely to benefit from endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy. (See "[Clinical manifestations and diagnosis of sphincter of Oddi dysfunction](#)".)

Intermittent small bowel obstruction may occur as a result of surgical adhesions, inflammatory bowel disease, or small bowel mass lesions. (See "[Small bowel obstruction: Clinical manifestations and diagnosis](#)".) The symptoms are typically abdominal pain and bloating that follow meals by a reasonably consistent time interval. Weight loss may ensue. Depending on the etiology of the obstruction, evidence of progressive systemic illness may develop. Abdominal CT scanning or small-bowel follow-through may reveal the lesion. In cases where suspicion remains high and initial investigations are normal, a small bowel enteroclysis is a more uncomfortable, but



highly sensitive, test for this indication. (See ["Small bowel obstruction: Clinical manifestations and diagnosis"](#).)

**INFORMATION FOR PATIENTS** — UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5<sup>th</sup> to 6<sup>th</sup> grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10<sup>th</sup> to 12<sup>th</sup> grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

Basics topics (see ["Patient information: Stomach ache and stomach upset \(The Basics\)"](#) and ["Patient information: Chronic pelvic pain in women \(The Basics\)"](#) and ["Patient information: Upper endoscopy \(The Basics\)"](#) and ["Patient information: Acute abdomen \(belly pain\) \(The Basics\)"](#))

Beyond the Basics topics (see ["Patient information: Upset stomach \(functional dyspepsia\) in adults"](#) and ["Patient information: Chronic pelvic pain in women"](#) and ["Patient information: Upper endoscopy"](#))

#### SUMMARY

Abdominal pain is a common problem. Most patients have a benign and/or self-limited etiology, and the initial goal of evaluation is to identify those patients with a serious etiology for their symptoms that may require urgent intervention.

Patients with abdominal pain who are acutely ill and unstable require immediate transfer to emergency care for diagnosis and resuscitation.

The initial consideration in abdominal pain should be whether the symptoms are acute or chronic. Patients with subacute symptoms must be considered as possibly having etiologies for either acute or chronic pain.

Patients with acute abdominal pain should first be assessed for a surgical abdomen. Patients with evidence of peritonitis or obstruction should be urgently referred for surgical evaluation.

Patients with acute abdominal pain without evidence of a surgical abdomen should be assessed based on the location of their pain.

Most patients with chronic abdominal pain have a benign functional disorder such as irritable bowel syndrome or functional dyspepsia. These diagnoses may be made without extensive diagnostic workup in younger patients, but should only be made with caution in those over the age of 50.



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