Abdominal Pain in the Geriatric Patient

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KEYWORDS

- Abdominal pain in the elderly
- Atypical presentations of common abnormalities in the elderly • Approach • Geriatric

KEY POINTS

- Evaluation of the elderly patient with abdominal pain can be difficult, time-consuming, and fraught with potential missteps.
- Abdominal pain is the most common emergency department complaint and the fourth most common complaint among elderly patients.
- The physiologic, pharmacologic, and psychosocial aspects of elderly patients make evaluation of their abdominal pain different than in the general population.
- Having a lower index of suspicion for abnormality and ordering tests will help make diagnoses, and getting ancillary services like pharmacy involved in the patients' care, can be of innumerable benefit.

INTRODUCTION

Evaluation of the elderly patient with abdominal pain can be difficult, time-consuming, and fraught with potential missteps. Still, it will be an increasingly common task of the emergency physician as the population ages. The US population over the age of 65 continues to grow, and patients of this age group are the fastest growing group of emergency department (ED) users. Accordingly, the past few years have seen a dramatic increase in research and focus on the emergency care of elderly patients.[1]

Abdominal pain is the most common ED complaint and the fourth most common complaint among elderly patients. The physiologic, pharmacologic, and psychosocial aspects of elderly patients make evaluation of their abdominal pain different than in the general population. Consequently, this population is prone to worse outcomes, higher rates of admission and surgical interventions, and prolonged ED and hospital stays

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compared with younger patients.[2] Alarmingly, mortality in patients greater than age 80 with abdominal pain nearly doubles if initial diagnosis is delayed.[3] This article aims to address general aspects of approaching abdominal pain in elderly patients as well as specific commonly encountered abnormalities in this population.

GENERAL APPROACH

Limitations to History-Taking

Within the initial step of gathering a history of the presenting illness, a clinician should be aware of potential complexities unique to an elderly patient. Elderly patients often present later in their disease course with vaguer and broader symptoms than their younger counterparts.[4] Normal age-related decline in hearing and vision may impede the patient's ability to communicate effectively with a physician. Cognitive impairments may further limit communication or diminish a patient's effective recollection of their illness progression. Patients themselves may underreport symptoms because of assumptions that symptoms are a part of the normal aging process or for fear of loss of independence with increased health care needs.[5] Alternatively, a provider may need to rely on family members or home health assistants to supplement the clinical history.

Limitations to Physical Examination

Physiologic changes inherent in the aging process can diminish the usefulness of the physical examination for elderly patients. Changes in the gastrointestinal (GI) as well as neurologic, musculoskeletal, and immunologic system lead to much higher rates of atypical presentations of common disease. Only 17% of elderly patients with perforated appendicitis presented with "classic" complaints.[6] Atrophy of abdominal wall musculature diminishes rebound and guarding.[7] Changes in peripheral nerve functioning lead to later and subtler presentation of pain.[8] Medications commonly taken by elderly patients, including β-blockers, steroids, nonsteroidal anti-inflammatory drugs (NSAIDs), and opiates, may blunt or alter their response to disease. They may also impair their ability to demonstrate a fever or the expected tachycardic response seen in younger patients. Similarly, changes to T-cell functioning in the elderly patient lead to a higher susceptibility to infection and decreased rate of leukocytosis on laboratory results. One study showed that 30% of patients over the age of 80 with intra-abdominal abnormality requiring surgery developed neither fever nor leukocytosis.[9]

Imaging

The high pretest probability of surgical abnormality and the decreased reliability of physical examination should lead the ED physician to a low threshold for using advanced imaging in elderly patients with abdominal pain. In this population, disposition and management decision may be significantly altered by results of computed tomographic (CT) imaging, which should be the imaging test of choice in most cases of elderly abdominal pain. In one study, the diagnostic certainty of emergency physicians assessing elderly patients with abdominal pain was increased from 36% to 77% after obtaining a CT scan.[10]

Plain films are generally of limited diagnostic use, although they may be helpful for identifying features such as sigmoid or cecal volvulus, bowel obstruction, or the presence of free intraperitoneal air. Ultrasound is the imaging of choice for biliary and pelvic diseases as well as for early identification of abdominal aneurysms, although it may be limited by body habitus, bowel gas, and operator competence.

General Treatment and Disposition Considerations

Symptomatic and definitive treatment of elderly patients poses unique concerns that cannot be categorized into traditional teachings. Selecting and dosing appropriate analgesic medication may be complicated by comorbid renal and liver insufficiency, dementia and fall risk, patient tolerance or intolerance of opiates, and difficulties in obtaining vascular access. Both underdosing and overdosing of medications are relevant concerns in elderly patients, unsurprisingly leading to widespread discomfort of emergency physicians in managing elderly pain.[11] Consequently, elderly patients are less frequently screened for pain and often inadequately provided analgesia.[12] The Beers Criteria for potentially inappropriate medications (PIM) for use in older adults caution against several commonly used medication for the treatment of abdominal pain, most notably ketorolac and metoclopramide.[13]

In general, assessing the risk-benefit ratios of disposition options is multifactorial and more complicated than in younger cohorts. Nearly half of elderly patients with abdominal pain will require admission, and one-third will require surgical intervention.[2] Forty percent of abdominal surgeries in geriatric patients occur in an acute (urgent or emergent) time frame, with a corresponding 10- to 15-fold increase in morbidity and 3- to 5-fold increase in mortality compared with elective surgery and worse outcomes compared with younger cohorts.[14] Although the prevalence of multiple comorbidities makes many elderly patients less than ideal surgical candidates, it is not clear how to fully incorporate these into accurate prognoses.[15] Similarly, the iatrogenic risks of hospitalization, including falls, physical deconditioning, and nosocomial infection, increase with age, underscoring the potential harm of even conservative observation of undifferentiated abdominal pain.[16] Still, given the difficult and unreliable nature of evaluating elderly abdominal pain, a low threshold for observation or hospitalization should be used.

SPECIFIC ABNORMALITIES

Small-Bowel Obstruction

Small-bowel obstructions (SBOs) are a common cause of abdominal pain in the elderly and may present more subtly than in younger patients.[17] Although symptoms classically include diffuse abdominal pain, distention, vomiting, and constipation/obstipation, these symptoms may not manifest early in the presentation. Paradoxically, diarrhea may be present as a result of hyperperistalsis distal to the obstruction point. Previous studies have suggested concerning mortalities for SBO in geriatric patients up to 26%, although more recent studies suggest outcomes in geriatric patients similar to the general population.[18] For patients without indications for urgent surgery, initial conservative medical management should include intravenous fluid resuscitation, nasogastric decompression, and temporary NPO (nothing by mouth) status, with surgery following if not improved in 24 to 48 hours. Patients admitted to a surgical, rather than medical service, are noted to have less delay in progression to surgery when necessary, and corresponding improvements in outcomes.[18] As in younger patients, hernias or intra-abdominal adhesions cause most SBOs in the elderly. However, unique to elderly patients, gallstone disease may contribute to 25% of bowel obstructions compared with 2% in the general population.[19]

Large-Bowel Obstruction

Although still uncommon, large-bowel obstructions occur more frequently in elderly patients than in the general population. Most cases result from diverticulosis and malignancy, the rates of which increase with age. Accordingly, elderly patients presenting with large-bowel obstructions should be questioned regarding symptoms and risk

factors for colorectal cancer. Similar to a SBO, patients classically present with abdominal pain, vomiting, and constipation/obstipation, although diarrhea is seen in one-fifth of patients, and only one-half will report constipation or vomiting.[20] Similar to SBOs in this age group, large-bowel obstructions are commonly only discovered late in their course and accordingly have a high mortality, ranging from 12% to 50%.[21]

Sigmoid and cecal volvulus account for a smaller subset of large-bowel obstructions, but more often requires emergent surgical intervention.[22] Reported symptoms can provide some differentiation between volvulus site. Sigmoid volvulus, causing close to 80% of volvuli, causes a more gradual onset of pain, whereas cecal volvulus presents more acutely. As would be expected anatomically, sigmoid volvulus can often be decompressed with a rectal tube, sigmoidoscope, or barium enema, whereas cecal volvulus requires surgical repair. Volvulus of either site is at risk for perforation and should be decompressed urgently.[23] Sigmoid volvulus has a high rate of recurrence and often requires definitive surgery, which may be performed electively if the volvulus can be decompressed nonoperatively.

Functional impairment and decreased motility of the GI tract can occur from medications and mimic symptoms of large- or small-bowel obstructions.[24] Given the increased rates of polypharmacy in older adults, this possibility should be noted when evaluating elderly patients. Medications with opioid or anticholinergic effects can cause ileus. In a more severe form, patients may develop acute colonic pseudo-obstruction, or Ogilvie syndrome. Ogilvie syndrome, a functional obstruction of the GI tract, occurs more commonly in elderly, debilitated patients, particularly those that are institutionalized or in prolonged hospital course.[25] Treatment is conservative medical management similar to SBOs. Alternatively, treatment with neostigmine has been offered as an acute therapy.[26] This treatment is highly effective in a short time period but requires careful monitoring because of the risk of bradycardia.

Biliary Tract Disease

The incidence of cholelithiasis increases with age to up to 33% by age 70, as does the severity of subsequent biliary tract disease in elderly patients.[27] Gallbladder perforation, gangrene, emphysematous cholecystitis, ascending cholangitis, gallstone ileus, choledocholiathisis, and gallstone-induced pancreatitis are all more prevalent in elderly patients than the general population.[28] As such, biliary disease constitutes the leading reason for acute abdominal surgery in elderly patients.[29]

Cholecystitis may be harder to detect in elderly patients than the general population. Although right upper quadrant or epigastric pain and tenderness are common, more than half of elderly patients with acute cholecystitis will lack nausea, vomiting, or fever.[30] Laboratory and imaging studies may be similarly unhelpful. Leukocytosis may be absent in 30% to 40% of those with acute cholecystitis.[31] Evaluation by ultrasound (**Fig. 1**) may be less helpful given the increased prevalence of acalculous cholecystitis as well as cholodocolithiasis. If available, HIDA (hepatobiliary) scan may be useful when a high clinical suspicion exists.

With the increased rate of complications of cholecystitis in older adults, broad-spectrum antibiotics and prompt surgical evaluation should be pursued once a diagnosis of cholecystitis is made. Delay in surgery may result in an increased mortality.[32]

Pancreatitis

The incidence of pancreatitis increases 200-fold after the age of 65, making it the most common nonsurgical emergent abdominal abnormality in the elderly.[33] The mortality for elderly patients exceeds that of the general population, approaching 40%.[34] Compared with the broader causes of pancreatitis seen in younger patients, nearly

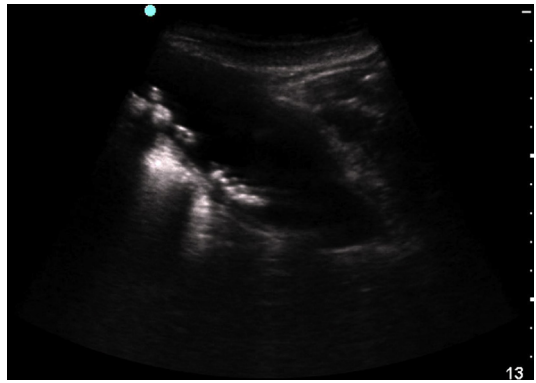

Fig. 1. Ultrasound of gallbladder, demonstrating stones with acoustic shadowing. (*Courtesy of* Nelson B, MD, New York City, NY.)

half of pancreatitis in elderly patients results from gallstones.[33] As with other abdominal processes, pancreatitis may present in elderly patients in a manner different than the classic upper abdominal pain radiating to the back with nausea and vomiting. Recent guidelines suggest that a diagnosis of pancreatitis should be made if at least 2 of 3 criteria are fulfilled: upper abdominal pain, elevated pancreatic enzymes, ultrasound/CT/MRI findings suggestive of pancreatitis, with CT being the preferred imaging modality.[35] The index of suspicion for pancreatitis should be low, prompting a low threshold for imaging in elderly patients. The rate of necrotizing pancreatitis in elderly patients is increased, underscoring the importance of imaging.[36]

Peptic Ulcer Disease

There is a high incidence of peptic ulcer disease (PUD) in the elderly population, due in part to the increasing use of NSAIDs in that age group. Users of NSAIDs are 5 to 10 times more likely to develop PUD.[37] Similarly, patients on corticosteroids are at increased risk, particularly when combined with NSAIDs. It is important to take a thorough drug history, because patients may not consider an over-the-counter medication as part of the list they provide to staff. There is a significant amount of patients who will not admit their use of aspirin, even on direct questioning, so it must always be considered.[38]

Helicobacter pylori colonization is greatly increased in the elderly, with some estimates of 53% to 73% of elderly being colonized,[39] leading to increased risk of PUD. The risk of bleeding from PUD is about 14 times higher in the population over the age of 70 than patients under the age of 40,[40] and the overall mortality from PUD is 100 times higher in the elderly population.[23] Elderly patients are more likely to bleed, rebleed, require blood transfusions, and require surgery to control bleeding than younger patients.

Diagnosing PUD in elderly patients can be difficult in the absence of typical pain. A common presentation may just be melena,[41] or even signs of long-term blood loss, like heart failure or chest pain. In elderly patients, visceral perforation is often painless, with no rigidity on examination. Free air may be absent on radiograph; thus, a low threshold for ordering a CT scan is indicated. In one study, up to 50% of patients with perforation did not show free air on the plain radiographs.[19]

Diverticular Disease

The formation of diverticula in the colon is related to chronic constipation, a lack of enough water, and physical inactivity, as well as increased bowel transit time. They

are usually seen in patients older than 40 years and are present in approximately 50% to 80% of older patients.[42] Approximately 80% of patients with diverticulosis are asymptomatic.[43]

Acute diverticulitis occurs when the diverticula become obstructed by fecal matter, resulting in lymphatic obstruction, inflammation, and perforation. The usual presenting complaints are left lower quadrant abdominal pain, with or without bloody stools, nausea, and fever. Atypical presentations include lack of fever, leukocytosis, and absence of guaiac-positive stool. Nearly 30% of the geriatric presentations of acute diverticulitis do not have abdominal tenderness on examination.[44] It is important that endoscopy be performed to rule out carcinoma after an acute episode of diverticulitis. Neoplasms are found in about 15% of patients with diverticulitis.[45]

Most cases of diverticulitis in Western countries are located in the left colon; right colonic involvement is more common in Eastern nations. Right-sided diverticula are more often the case of bleeding than the left colon.[46] Most acute flares of diverticulitis, even those with small perforations, can be managed medically, with antibiotics covering gram-negative and anaerobes, intravenous fluids, and bowel rest. If there are larger perforations or abscess formation, surgery or percutaneous drainage may be indicated.

Unfortunately, in the elderly, acute diverticulitis tends to present in a more severe manner, most likely due to the use of antiplatelet medication in this age group. The operative risk in this group is high, approaching 5%.[47,48]

Diverticular bleeding is one of the most common causes of lower GI bleeds. The risk of bleeding increases with age, male gender, and the use of NSAIDs or anticoagulants.[49]

Appendicitis

Appendicitis is a very common surgical emergency. It is often a very difficult diagnosis to make in the elderly patient population and is missed in the elderly about 54% of the time.[50] As mentioned in the introduction of this section, studies show that only 17% of elderly patients with perforated appendicitis had a classic presentation.[6] The classic presentation is defined as right lower quadrant pain, fever, and elevated white blood cell count.

The widespread use of CT scanning has helped to minimize unnecessary surgery and is very sensitive in the elderly population, showing 91% to 99% sensitivity.[51] The rates of renal insufficiency in the elderly make the use of intravenous contrast dye for the study sometimes contraindicated. In recent years, literature has emerged supporting the use of noncontrast CT imaging for suspected appendicitis, and it seems to be appropriate for decision-making in the ED.[52,53] There is a growing body of literature regarding the use of ultrasound in diagnosing appendicitis. As with any ultrasonography study, it is operator-dependent and made more difficult by patients' body habitus and bowel gas patterns.

The prognosis of uncomplicated appendicitis in both young and old age groups is nearly equal. However, perforation worsens the condition, dramatically resulting in higher rates of morbidity and mortality.[54] In this same article, the investigators concluded that although the rate of perforation is similar in age ranges, the elderly often have a delay in presentation to the hospital.

Elderly patients have a higher risk for both mortality and morbidity following appendectomy than younger patients.[50] There is a growing body of literature about the nonoperative management of appendicitis. Given the operative risks, it is hoped that the geriatric population would be an appropriate group for further study on a change in practice to demonstrate outcomes similar to those undergoing surgery.[55]

Extra-Abdominal Causes of Abdominal Pain

The elderly, like the pediatric population, can manifest extra-abdominal abnormality as abdominal pain because of referred pain and inability to localize, or perhaps to communicate specific symptoms.

Congestive heart failure can often present as abdominal pain. The character of the pain is typically dull or described as a fullness, which will not be relieved until the heart failure is addressed. Importantly, acute myocardial infarction must always be on the differential with a complaint of nausea and epigastric discomfort. In one study, 45% of women over the age of 75 with an ST segment elevation myocardial infarction presented without chest pain, but simply with GI symptoms.[56]

Pneumonias have been reported as a frequent cause of referred abdominal pain, epically lower lobe infections.[57] Other pulmonary causes can include pulmonary embolus, heart failure, pneumothorax, and empyema. A low threshold for chest radiographs in recommended.

Genitourinary complaints are often difficult to tease out, because dysuria is not always present in the geriatric patient, and if there is a component of altered mental status, occult infections become very important to consider. One must be careful, however, when attributing the abdominal pain to a urinary tract infection. There is a high incidence of asymptomatic bacteria in the elderly, up to 18%, and this increases with age.[58] Prostatitis can also be a very difficult diagnosis to make, given its often vague symptoms.[59] A rectal examination is pivotal in the workup of abdominal pain, and especially with genitourinary complaints.

Urinary retention is also a very common cause of nonspecific abdominal pain and can be caused by several different abnormalities. Medications, especially the antihistamines and anticholinergics, can cause retention (**Fig. 2**). There can be physical outlet obstruction, or bladder dysfunction from a neurologic catastrophe, such as stroke, intracranial bleed, or spinal cord injury. Pyelonephritis can be a difficult diagnosis to make as well, because many elderly patients do not have the traditional costovertebral angle tenderness on examination.[60]

Other systems such as dermatologic are often missed. Herpes zoster should be considered. An attack of herpes zoster involving the thoracic dermatomes can sometimes cause severe right upper quadrant pain, which can be confused with other disease states such as acute cholecystitis.[61] Rashes can be a manifestation of other

Fig. 2. Ultrasound of bladder with retention. (*Courtesy of* B. Nelson, MD, New York City, NY.)

abnormality, or they themselves a cause of abdominal pain in the elderly, so it is crucially important to fully undress patients for the physical examination.

Rectus sheath hematomas (RSH) must always be considered, especially in patients who are on anticoagulation, such as low-molecular-weight heparin or warfarin. There is a high mortality in this group, and imaging should be pursued on patients with an otherwise unexplained abdominal pain. The mortality risk from RSH is 4% overall, but may be as high as 25% in patients on anticoagulation.[62]

Depression or somatization in the elderly may present as abdominal pain, and practitioners should maintain a low threshold for performing a depression screening on patients. In one study, about 24% of elderly patients presenting to the ED with abdominal pain had negative workups in terms of an intra-abdominal diagnosis.[17] Although it is not clear whether those patients had a diagnosis of depression, the clinician should have a low threshold for performing a depression screen on patients presenting with abdominal pain that has no clear diagnosis.

Constipation

Constipation is a common condition in the elderly, with prevalence ranging from 24% to 50%.[63] It is defined as unsatisfactory defecation, infrequent stools, or difficulty with stool passage. In older adults, constipation may be associated with fecal impaction and fecal incontinence. Fecal impaction can cause mucosal ulceration, bleeding, and anemia. Laxatives are used daily by 10% to 18% of community-dwelling older adults and 74% of nursing home residents.[64]

There are important differences between constipation in the elderly and in the young. In young people, the condition is often caused by poor dietary choices, including lack of fiber. In the geriatric patient, medications, comorbidities, inactivity, and decreased gastric-emptying time as well as GI malignancies are important to consider.[23] In one study, a low-calorie diet, low fluid intake, high protein diet, and psychological distress were linked to constipation. Distress was defined as depression, anxiety, obsessive-compulsive disorder, and somatization disorder.[65]

A digital rectal examination should be performed on all patients with constipation to rule out mechanical obstruction of stool, or other pelvic floor abnormality, such as rectal or uterine prolapse. Blood in the stool, a change in the caliber of the stool, acute onset of constipation, or a strong family history of malignancy should trigger a more extensive workup.

In the elderly, given the risk of medication side effects, it is best to treat chronic constipation with dietary and activity changes. If that has already been tried, then a bulk laxative, like psyllium, would be safest. If an enema is indicated, then a warm water enema would be the safest to administer, as opposed to a medication-containing preparation.

Malignancy

About 10% of elderly patients that present to the ED with a nonsurgical abdominal pain will be found to have a malignancy.[66] Malignancies can present as different types of abdominal pain, but a history of unintentional weight loss, night sweats, and fatigue should raise suspicion for a malignancy. It may also present as peritonitis, ascites, perforation, or abdominal mass. Unfortunately, many cases of malignancy are discovered once they are already metastatic.[67] Different types of malignancies may have different presentations. For example, renal cell carcinomas may have flank pain and hematuria, but often are asymptomatic and diagnosed on imaging.[68] Colonic and rectal malignancies often present as constipation, or with dark or bloody stools.

Pharmacology

The elderly often have a long list of medications that can be the cause of clinical conditions and complicate the making of some diagnosis. They are more susceptible to different types of medication errors than in the younger population. PIM have been studied many times. A range of 12% to 20% of geriatric ED patients received PIM.[69,70] PIM include narcotics, NSAIDs, anti-inflammatories, sedative-hypnotics, muscle relaxants, and antihistamines. These medications can lead to such varied abnormality as altered mental status, renal failure, GI bleeding, and constipation. Unfortunately, they are often administered to the elderly inappropriately.

ED -dedicated pharmacist involvement can predict and prevent medication side effects and interactions. The geriatric population would logically have a high potential from benefit from clinic pharmacists in the ED.[71]

When treating patients over the age of 65, it is essential that the Beers list be consulted, before ordering any medications.[13] This list provides invaluable information and guidelines as to which medications may not be safe in older adults.

Disposition/Special Considerations

There are a growing number of specially designed Geriatric EDs that are being constructed in the United States. Traditional physical plants and layouts of EDs are not safe for older adults that may have hearing or visual impairment, or suffer from cognitive decline. Falls can occur, epically during times of crowding and inadequate staffing. Specially designed Geriatric EDs have more protocolized interventions of ancillary services like physical and occupational therapy, volunteers, and staff to arrange from home services, to help reduce the rate of hospital admissions.[72]

If the decision is made to discharge a patient with a presenting complaint of abdominal pain, it is important to document a repeat physical examination, and that the patient is tolerating oral intake, and a follow-up appointment with a primary care provider is made.[73] The patient should have a responsible adult to monitor and assist them should their condition worsen. If a definite follow-up time is unable to be made, the patient should be told to return to the ED for a recheck.

Many of the above-described clinical conditions require the use of CT scanning, often with intravenous contrast. The provider should be aware of the risk of renal failure with contrast studies and should use the glomerular filtration rate (GFR), as opposed to serum creatinine, to decide whether contrast would be safe in the patient; this is important because as aging occurs, the GFR will decrease. Decreased muscle mass and protein intake, both very common in the elderly, can result in the serum creatinine to be falsely elevated.[74] Although ultrasound has become more common at the bedside, it does remain operator-dependent and cannot show other, unexpected abnormalities that commonly occur in the elderly.

SUMMARY

By 2030, 1 in 5 Americans will be over the age of 65, with many more living to be greater than 100. Clinicians need to be vigilant so as to not miss potentially serious conditions that may be difficult to diagnose in the geriatric population. Any acute abdominal pain is important in an elderly patient. There is no single test that can help the clinician to make a decision about admission versus discharge.[75] Therefore, one would advocate a liberal policy for at least a period of observation, if not admission, for repeat abdominal examinations. Unfortunately, about 60% of abnormality in the geriatric patient requires surgery,[4] and their mortality is 10 times higher than that of the young.[76]

There are more often than not atypical presentations of common diseases and uncommon diseases as well. Having a lower index of suspicion for abnormality and ordering tests will help make diagnoses, and getting ancillary services like pharmacy involved in the patients' care can be of innumerable benefit.

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