ACUTE ABDOMINAL PAIN IN THE ELDERLY

Ching-Chih Chang¹, Sun-Sang Wang¹,²,³*
¹Taipei Municipal Gan-Dau Hospital, ²National Yang-Ming University School of Medicine, and
³Division of Gastroenterology, Department of Internal Medicine, Taipei Veterans General Hospital, Taiwan

SUMMARY

Abdominal pain is a common occurrence in the elderly patients and poses a difficult challenge for the emergency physician. Previous studies demonstrated that among the elderly patients presenting to the emergency department with abdominal pain, at least 50% were hospitalized and 30–40% eventually had surgery for the underlying condition. Reasons for the difficult diagnosis of acute abdomen in the elderly are multifactorial, and hence the diagnostic accuracy is lower and the mortality far higher in them than in the younger patients. High suspicion, widely differential diagnosis, and more aggressive use of imaging modalities are critical for these patients. In the geriatric population, biliary tract disease accounts for nearly 25% of cases of acute abdominal pain, followed by nonspecific pain, malignancy, bowel obstruction, complicated peptic ulcer disease, and incarcerated hernia. Acute appendicitis, pancreatitis, and diverticulitis are uncommon but important causes of acute abdomen in the elderly. Abdominal vascular diseases, including abdominal aortic aneurysm and mesenteric ischemia, are a rare but lethal condition in acute abdomen. Management of the elderly patients with acute abdomen should focus on keeping the vital signs, adequate hydration, and early administration of analgesics and antibiotics. Consultations with radiologists and surgeons are crucial in the management of difficult cases. [International Journal of Gerontology 2007; 1(2): 77–82]

Key Words: acute abdominal pain, elderly

Introduction

Abdominal complaints are the leading reason for seeking care in the emergency department (ED) and are estimated to account for 5–10% of all visits¹. Abdominal pain is a common occurrence in the elderly patients and poses a difficult challenge for the emergency physician. Since the mean age of the population is increasing, acute abdominal pain in the elderly is becoming more significant and important for the physician. The definition of “elderly” varies among different studies, but most authors define patients older than 65 years as elderly. The term “acute abdomen” may be applied if the onset of pain is sudden and unexpected and if the pain is present for less than 24 hours and associated with other gastrointestinal symptoms.

Previous studies demonstrated that among the elderly patients presenting to the ED with abdominal pain, at least 50% were hospitalized and 30–40% eventually had surgery for the underlying condition²,³. Some authors reported that approximately 40% of the elderly patients with acute abdomen were misdiagnosed, contributing to an overall mortality of approximately 10%⁴. In a report on 1,000 elderly persons admitted to a hospital surgical service, Fenyo⁵ noted the importance of accurate preliminary ED diagnosis of abdominal complaints when he found a mortality rate of 8% among patients with the correct ED preliminary diagnosis as compared with 19% when the diagnosis was delayed until after admission to the hospital. Therefore, early and correct diagnosis for the elderly patients with acute abdomen is critical and significantly influences the outcome of these patients. Reasons for the difficult diagnosis of acute abdomen in the elderly are multifactorial.
Firstly, many diseases present and evolve differently in the elderly patients. The symptoms and signs in older patients are frequently milder and less specific than in younger adults with the same disease. Secondly, history-taking may also be affected by cognitive impairment due to old age. The interview process may be lengthened because of communication barriers, such as hearing impairment, dementia, or psychiatric disorder. Thirdly, preexisting conditions, the inability to localize tenderness, and certain medications such as pain killers and steroids have potential to interfere with the physical examination. These factors cause the diagnostic accuracy to be lower and mortality far higher in the elderly than in the younger patients.

Although previous studies have highlighted lower diagnostic accuracy and higher mortality in the elderly patients with acute abdomen, the current modality and diagnostic tools has dramatically improved in the modern ED. The widely used abdominal sonography and multi-detector row computed tomography (CT) significantly help in making a definite diagnosis of acute abdomen. Assumedly, the mortality in the elderly patients with acute abdomen has currently decreased when compared with that of previous studies. This article will review the pathophysiology, diagnosis, and management of the elderly patients with acute abdominal pain.

Pathophysiology
Abdominal pain may be the presenting symptom in a wide range of diseases. The elderly patients with intra-abdominal pathology are more likely to present with symptoms other than abdominal pain, such as fever, fatigue, anorexia, or altered mental status. The following diseases are discussed according the frequency of occurrence in the elderly patients with acute abdomen.

Biliary tract disease
Biliary tract disease is the most common indication for intra-abdominal surgery in the elderly\(^1\). Several studies have reported the incidence of cholelithiasis to be greater than 50% in patients older than 70 years old, and acute cholecystitis is the most common cause of acute abdominal disease in the elderly, ranging from 25 to 41% in various series\(^6\). The typical findings of acute cholecystitis include right upper quadrant abdominal pain, tenderness, and Murphy’s sign. However, clinical findings often do not correlate with the severity of the disease in the elderly. In one study, 40% of acutely ill patients had empyema of the gallbladder, gangrenous cholecystitis or free perforation, and 15% had concomitant subphrenic or hepatic abscess; yet, of these patients, more than one-third were afebrile and a quarter did not have abdominal tenderness\(^7\). Fever, leukocytosis, and mild jaundice (total bilirubin less than 4 mg/dL) are often observed in patients with acute cholecystitis. Marked elevation of total bilirubin level or dilated bile duct in the imaging study should highlight the presence of common bile duct stone with suppurative cholangitis. Immediate drainage of bile and proper antibiotics treatment are critical in these patients.

Malignancy
Among the elderly patients discharged from the ED with a diagnosis of nonspecific abdominal pain, approximately 10% are eventually diagnosed with an underlying malignancy within a year\(^1\). Unless an alternative cause is diagnosed, the elderly patients with undiagnosed abdominal pain must be investigated for malignancy. The following symptoms should indicate the possibility of colorectal cancer in the elderly patients with abdominal pain: change in bowel habit, weight loss, vague pain with anorexia, and rectal bleeding.

Bowel obstruction
Obstruction of the large bowel or small bowel is a major health problem for the elderly. The common symptoms include abdominal distention, pain, nausea, and vomiting. In the elderly patients, the common causes of large bowel obstruction include colon cancer, diverticulitis, and volvulus. Adhesion, neoplasms, and hernia are usual causes of small bowel obstruction. The other less common causes of bowel obstruction include bezoar obstruction, gallstone ileus (gallstone impaction in the ileocecal region), and intussusception. Mechanical obstruction should be differentiated from adynamic ileus or pseudo-obstruction, which is attributed to sepsis, electrolyte imbalance, long-term bed confinement or central nervous systemic disease.

Peptic ulcer disease
The incidence of peptic ulcer disease is increasing in the elderly owing in part to the increasing availability and use of aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs). The complications include hemorrhage and perforation. Most of the elderly patients experience
peptic ulcer bleeding, even perforation without prodromal symptoms of epigastralgia. Approximately 35% of the elderly patients with peptic ulcer disease have no pain. The most common presenting symptom is melena. Free air is noted in the subphrenic area of upright chest X-ray film in patients with perforated peptic ulcer. Patients with higher risk of developing complications of NSAID use include those aged more than 65 years, receiving concurrent steroids or anticoagulants, with a history of peptic ulcer disease, receiving higher doses of NSAIDs or with a severe underlying disease (liver cirrhosis, uremia or autoimmune disease). Mortality in the elderly patients with peptic ulcer disease is approximately 100 times higher than in the younger patients.

**Diverticulitis**

Colonic diverticular disease has also increased with the mean age of the population. For those over 60 years of age, it has been estimated that over 30% have diverticulosis, and one-third will develop diverticulitis. Diverticulitis presents as an acute abdomen followed by fever and lower gastrointestinal bleeding. The sigmoid colon is involved in most patients with typical left lower quadrant abdominal pain. However, acute diverticulitis of the right side of the colon is more frequent in the East, and it is easily misdiagnosed as acute appendicitis. Elderly patients with diverticulitis are more often afebrile and present with leukopenia. Complications, including abscess, fistula or peritonitis, are also more frequent in the elderly patients. Abdominal CT scan is the most sensitive modality for finding the complications of diverticulitis. When massive bleeding occurs, an emergency surgical consultation should be obtained.

**Appendicitis**

Appendicitis is often thought of as a disease of the young. Only approximately 10% of cases of acute appendicitis occur in patients older than 60 years of age, whereas one-half of all deaths from appendicitis occur in this age group. Typically, acute appendicitis begins with prodromal symptoms of anorexia, nausea, and vague periumbilical pain. Within 6–8 hours, the pain migrates to the right lower quadrant and peritoneal sign develops. This is known as the “Murphy’s sequence”. However, one study reported that among the elderly patients with acute appendicitis, 39% had vomiting, 45% had nausea, and only 35% had typical abdominal pain with Murphy’s sequence. The rate of appendicitis with perforation in the elderly patients is approximately 50%, which is five times higher than in younger adults. Nevertheless, the initial diagnosis is incorrect in 40–50% of the elderly patients, resulting in a higher mortality and morbidity. A high index of suspicion is necessary to avoid missing the diagnosis of appendicitis in the elderly.

**Pancreatitis**

Pancreatitis typically begins with an acute onset of epigastric and upper abdominal pain, which rapidly increases in severity and radiates to the back or left scapular region. The most common predisposing factors are alcoholism and biliary tract disease. Serum amylase has excellent sensitivity and specificity and is the initial assay of choice. A cut-off level of threefold elevation above the upper limit of normal is the best indication of pancreatitis. However, hyperamylasemia is found in many other diseases including extra-abdominal diseases. Some authors suggested that lipase is the more accurate test in acute pancreatitis and recommended that lipase replace amylase as the initial enzymatic test for acute pancreatitis in the ED.

**Mesenteric ischemia**

Acute ischemic syndromes include embolic arterial occlusions, thrombotic arterial occlusion, nonocclusive mesenteric ischemia, and venous thrombosis. Acute embolic arterial occlusions are found in half of these cases. The diagnostic triad of superior mesenteric arterial embolism consists of acute abdominal pain, presence of significant cardiac disease, and acute gastrointestinal emptying (diarrhea or vomiting). Although angiography is the standard diagnostic tool, abdominal CT scan is the best initial diagnostic test in the ED, because it is less invasive and more easily available. Including mesenteric ischemia in the differential diagnosis is important in the elderly patients with acute abdomen, even though it accounts for less than 1% of cases, because a delay in diagnosis causes a mortality rate of about 70–90% in patients with mesenteric ischemia.

**Abdominal aortic aneurysm**

Rupture or dissection of an abdominal aortic aneurysm is a catastrophic event with significant mortality. An overall death rate of 70% is noted, despite achieving an average ED time of 12 minutes before surgery. The classic presentations are abdominal pain, hypotension, flank pain, and a pulsatile abdominal mass.
Approximately 30% of patients with ruptured aortic aneurysm are initially misdiagnosed as having renal colic due to hematuria or diverticulitis with gastrointestinal bleeding due to melena and shock. Therefore, all patients presenting with backache should undergo palpation of the abdomen to help rule out abdominal aortic aneurysm.

**Urogenital disease**
There is a high incidence of urinary tract infection in the elderly. Acute pyelonephritis may present with fever and abdominal pain. The incidence of urinary tract infection is higher in women than in men. Besides, benign prostatic hyperplasia is a troublesome problem for older men, and it induces acute urinary retention or lower abdominal pain if some anticholinergic drugs are prescribed. Urinary tract stone is another common problem for patients with an abrupt onset of flank pain and abdominal pain. Ovarian cancer, cervical cancer or endometrial cancer is more common in the elderly female, and it presents with abnormal vaginal discharge or lower abdominal pain. The importance of a pelvic examination in the older female with a complaint of abdominal pain cannot be overemphasized.

**Miscellaneous causes of abdominal pain**
In patients with risks of coronary arterial disease, acute myocardial infarction (especially those involving the inferior wall of the heart) should be expected in the initial presentation of epigastric pain. Congestive heart failure with hepatic congestion, pericarditis, and endocarditis can all present with abdominal pain in the elderly.

Metabolic problems, such as diabetic ketoacidosis, Addison’s disease (adrenal insufficiency), and acute intermittent porphyria, can be presented with acute abdominal pain in the elderly patients.

Auscultation of the chest and a search for pulmonary symptoms are important in the evaluation of the elderly. Pneumonia, pneumothorax, pleural effusion, and pulmonary emboli can present with abdominal complaints.

Herpes zoster infection, muscle strain or contusion, and inguinal or ventral hernia are also common in the elderly patients with acute abdominal pain. Inspection of the abdomen is important and easily missed by a busy physician.

Several drugs, such as NSAIDs, antibiotics, potassium tablets, iron tablets, colchicines, and oral hypoglycemic agents, can induce abdominal discomfort. Digoxin or theophylline overdose also causes severe abdominal pain with anorexia. A thorough review of the medication history is essential and important for the elderly patients with abdominal complaints.

**Diagnosis**

**History taking**
Obtaining a detailed history of abdominal pain in the elderly patients is especially important for the physician. Elderly patients often cannot thoroughly describe the onset and evolution of their symptoms. Observations by family members or caregiver are important. The key points in the history should include: (1) the time of onset and course of the pain; (2) the location, quality, and severity of pain; (3) whether the pain is radiating elsewhere; (4) aggravating or precipitating factors; (5) prior similar episodes; (6) ability to pass stool or flatus; and (7) associated symptoms including fever, anorexia, vomiting, diarrhea, shortness of breath, chest tightness, melena or vomiting of coffee ground-like material. Past history and systemic review are also important. The major disease or operation of the patient should be elicited. Personal history, relating to alcohol consumption, smoking or allergies, is also important.

**Physical examination**
A physician’s experience decides his differential diagnosis of acute abdomen in the elderly. A thorough physical examination also decides the next step in the evaluation of the acute abdomen. The more experienced physician believes that the “hand scan” is more helpful than CT scan. It is still true for physicians in the modern ED. The vital signs are the most important for the elderly patients with acute abdomen. The abdominal examination includes auscultation, inspection, light and deep palpation, and percussion. Auscultation comes before percussion and palpation (the sounds may change after manipulation). High-pitched bowel sounds are often associated with bowel obstruction. Absence of bowel sounds may indicate severe ileus or peritonitis. In addition to bowel sounds, abdominal bruits can be heard in patients with aortic aneurysm. The peritoneal sign is less sensitive for the elderly patient with acute abdomen and should be especially elicited repeatedly if symptoms progress. Tympany is normally heard over most of the abdomen in the supine position. Unusual dullness may be a clue to an underlying abdominal mass.
or ascites. Besides the abdomen, cardiovascular, pulmonary, and genitourinary organs should be examined carefully to exclude extra-abdominal pathology of acute abdomen.

**Laboratory studies**

A routine complete blood cell count, urine analysis, stool examination, and serum chemistries are standard procedures for the elderly patients with acute abdomen. Both leukocytosis and leukopenia indicate infection or inflammation in the elderly patients. In immunocompromised or extremely old patients, a normal white cell count may also indicate severe infection. The liver biochemistry may also be completely normal in the elderly patients with biliary tract infection. A physician should keep the basic principle in mind: “Don’t treat the data, but the patient”.

**Imaging studies**

Over the last few decades, the most significant advancement in imaging studies of acute abdomen has been the development of multi-detector row CT (helical CT)\(^{16–18}\). Rapid breath-hold imaging and improved contrast enhancement techniques have enabled radiologists to obtain volumetric data that can be viewed in smaller slice increments. Helical data can also be analyzed utilizing multiplanar and three-dimensional techniques. Multi-detector row CT angiography is the preferred method for imaging in emergent abdominal vascular conditions. CT scan is the study of choice for suspected diverticulitis and is very sensitive in patients with possible appendicitis when the diagnosis is not clear\(^{11}\). With its proven ability to diagnose a wide variety of conditions, CT remains the diagnostic modality of choice for imaging the acute abdomen in the elderly.

Abdominal sonography is the initial study of choice when evaluating for biliary tract disease because of availability and speed. The graded-compression sonography has proven diagnostic value in clinically questionable cases of acute appendicitis\(^{19}\). Besides, abdominal sonography is an excellent rapid screening modality for aortic aneurysm, hepatic tumor or abscess, nephrolithiasis, and hydronephrosis. Plain film radiography, including radiography of the kidneys, ureters and bladder, and chest X-ray, is useful in detecting bowel obstruction, adynamic ileus, nephrolithiasis, and perforation of hollow organs. It should be obtained the first time to evaluate patients with acute abdomen. Electrocardiogram should be performed in all elderly patients with acute abdomen. Early detection of arrhythmia and ischemic heart disease is essential and lifesaving. Furthermore, mesenteric arterial ischemia is more prevalent in patients with atrial fibrillation. Angiography, nuclear medicine imaging, and magnetic resonance imaging are also helpful in some patients with selective diseases. However, these should be considered as the second-line tools as they are invasive and time-consuming.

**Management**

Elderly patients with acute abdominal pain presented to the ED should be closely followed up for the vital signs, mental status, and respiratory condition. Intravenous catheter should be filled with normal saline or lactated Ringer’s solution. The intravascular fluid status should be monitored via blood pressure, heart rate, and urine output. Adequate hydration and blood transfusion are essential if sepsis or acute blood loss occurs. Cardiac monitoring and oxygen supplementation with pulse oximetry monitor are critical for severely ill elderly patients. The elderly patients with acute abdomen should receive nothing by mouth until surgical pathology is excluded. Imaging studies, including abdominal sonography or CT scan, should be more aggressively arranged in the elderly patients with acute abdomen than in younger patients. Early in the course of evaluation of the patients with acute abdomen, the physician must consider the important role of analgesics and antibiotics. Despite data from well-designed studies showing that the administration of analgesics to patients with acute abdomen does not adversely affect the clinician’s ability to make a timely and accurate diagnosis, 75% of ED physicians withhold analgesics pending evaluation of the patient by a surgeon\(^ {20,21}\). This delay results in unnecessary suffering and is not warranted. NSAID is very effective for biliary and renal colic but should be administered with caution to the elderly, especially those with renal function impairment. In patients with undifferentiated abdominal pain, administering small doses of opiate is reasonable practice. However, morphine has been demonstrated to cause spasm of the sphincter of Oddi and should be replaced with meperidine in patients with suspected biliary tract disease or pancreatitis. Early surgical consultation is the prudent choice for the inscrutable acute abdomen.
Conclusion

Evaluation of the elderly patients with acute abdomen presents a unique challenge to the physician. Historical information and physical examination findings are often difficult to elicit and are unreliable. Similarly, laboratory findings may be within the normal limit in a seriously ill patient. High suspicion, wide differential diagnosis, and more aggressive use of imaging modalities are critical for these patients. In the geriatric population, biliary tract disease accounts for nearly 25% of cases of acute abdominal pain, followed by non-specific pain, malignancy, bowel obstruction, complicated peptic ulcer disease, and incarcerated hernia. Acute appendicitis, pancreatitis, and diverticulitis are uncommon but important causes of acute abdomen in the elderly, and usually become apparent late in their courses with high morbidity and mortality rates. Abdominal vascular disease, including abdominal aortic aneurysm and mesenteric ischemia, is a rare but lethal condition in acute abdomen and should be always be included in the differential diagnosis. Management of the elderly patients with acute abdomen should focus on keeping the vital signs, adequate hydration, and early administration of analgesics and antibiotics. Consultations with radiologists and surgeons are crucial in the management of difficult cases.

References