Abdominal Pain among Older Adults

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As the population is aging, physicians from all specialties are expected to see more older adults at their outpatient practices and in the acute settings. Abdominal pain remains one of the most common and potentially serious complaints that emergency physicians encounter. Vascular pathology should be considered early in the diagnostic course of all older adults who have abdominal pain because the time for intervention is critical.

**Key words:** abdominal pain, older adults, management of acute abdominal pain

**Introduction**

A thorough workup and broad differential diagnosis are essential elements to establishing a correct diagnosis. Older adults may have delayed presentations of serious illnesses, and their signs and symptoms of disease may be atypical. If a diagnosis is unclear, an early surgical consultation and hospital admission should always be considered.

In Canada, 13.7% of the population is older than 65 years and this number is expected to increase to 20% by the year 2030. As a result, the number of older patients who present to the emergency department (ED) with abdominal pain complaint will increase. This complaint must be considered seriously because nearly half of patients >65 years who present to the ED with abdominal pain are admitted, and as many as one-third require surgical intervention at some time during their admission.

Older adults may initially present to outpatient offices but frequently need additional evaluation in a more acute setting, either an ED or an inpatient unit. Older adults with abdominal pain who present to the ED typically require many resources (diagnostic tests, medications, and length of stay in the ED) and careful assessment for the decision of admission versus discharge. Of those older adults who have abdominal pain and are discharged home, nearly one-third return to the ED with continued symptoms.

**Presenting Symptoms**

When assessing older adults who have abdominal pain, health care providers should remember that chronological age may not fully reflect patients’ physiological age. The overall health condition should be considered.

Pain presentation in older adults may vary due to physiological changes, comorbidities, and polypharmacy. Difficulties with history-taking are often encountered; causes may be acute (delirium) or relate to coexisting morbidity (aphasia, dementia). Altered pain perception such as painless cardiac ischemia has been well described among older adults.

Laboratory studies should be ordered for side effects and interactions can provide an important element in the diagnosis.

A full history of the abdominal pain is crucial, including the pain description and character, location, onset, radiation, severity, duration, alleviating and aggravating factors, and previous episodes. These are outlined in Table 1.

**Physical Examination**

General appearance is the first step in a physical examination, followed by overall volume status. The evaluation of vital signs is an important step, although vital signs may be normal despite serious intra-abdominal pathology. Table 2 outlines the changes in vital signs that are essential to keep in mind when evaluating older adults.

The abdomen should be assessed fully, paying attention to note scars of previous surgeries, distension, organomegaly, ecchymosis, masses, or bruits. The abdominal musculature is often thin in older adults, leading to less guarding and rigidity, even in the presence of frank peritonitis. A detailed search for hernias should be conducted because they may be a cause of bowel obstruction and strangulation. The rectal examination may reveal the presence of gross or occult blood and may be the only way to discover prostatitis as a source of pain.

The physical examination should not be limited to the abdomen. Conjunctivae should be examined for pallor. The cardiopulmonary examination is crucial. It may suggest a diagnosis by showing signs of pneumonia, congestive heart failure, pericarditis, or pulmonary emboli. The presence of atrial fibrillation is of particular significance because this increases the risk for mesenteric ischemia. Examination of the extremities may reveal the presence of peripheral emboli or stigmata of vascular disease. Neurological findings of a previous cerebrovascular accident also may be a clue to underlying vascular disease.

**Diagnostic Studies**

**Laboratory Studies**

Laboratory studies should be ordered for older adults who have acute abdominal pain. Laboratory values are often normal despite the presence of surgical disease. High amylase is nonspecific, and although elevations may indicate pancreatitis, they also may be seen in mesenteric ischemia. Hematuria is commonly seen in individuals who have nephrolithiasis or a urinary tract infection, but it also may be found in cases of appendicitis, diverticulitis, or even ruptured abdominal aortic aneurysm (AAA). An electrocardiogram should be obtained early in
the workup of older adults who have abdominal pain.

**Imaging Studies**

**Plain Radiography**

Plain radiography is useful in the evaluation for free intraperitoneal air, signs of obstruction, and the rare case of foreign body ingestion or insertion.

**Ultrasonography**

The use of ultrasonography may be limited by body habitus, bowel gas, and operator dependence. Ultrasonography is the imaging modality of choice for biliary and pelvic diseases, and it is useful for diagnosing AAA.

**Computerized Tomography**

Computerized tomography (CT) is highly sensitive for diagnosing perforation, AAA, appendicitis, and other common entities. It is more useful than angiography in cases of suspected mesenteric venous thrombosis; however, angiography is the gold standard.

**Angiography**

Angiography is the gold standard when acute mesenteric ischemia is highly suspected. Preoperative angiography should be pursued for diagnostic and therapeutic reasons.

**Differential Diagnosis**

Acute abdominal pain can be categorized in multiple methods. The most common method is by dividing the causes into two main categories, such as surgical versus nonsurgical pain, and intra-abdominal versus extra-abdominal causes.

**Biliary Tract Disease**

Biliary disease is the leading reason for acute abdominal surgery among older adults. The mortality rate for emergency cholecystectomy is four times higher than for an elective cholecystectomy. The risk for complications in older adults has been always high. Complications may include gallbladder perforation, gangrene, emphysematous cholecystitis, ascending cholangitis, gallstone ileus, choledocholithiasis, and gallstone-induced pancreatitis.

Older adults who have cholecystitis have symptoms of right upper quadrant or epigastric pain with tenderness over the gallbladder. Other signs may be absent—more than half of older adults who have acute cholecystitis have no nausea or vomiting, and half also lack fever. Older adults have an increased likelihood of acalculous cholecystitis. A radionuclide (hepatobiliary iminodiacetic acid scan [HIDA]) scan should be performed.

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**Table 1: Components of Pain History**

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<thead>
<tr>
<th>Component</th>
<th>Details</th>
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<tr>
<td>Pain description</td>
<td>Aching or gnawing pain suggestive of visceral pain; the characteristically “sharp,” more defined and localized somatic pain associated with peritonitis</td>
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</table>
| Location               | Embryological origins of abdominal organs determine where a patient “feels” visceral pain:  
• Stomach, pancreas, liver, biliary system, and proximal duodenum have pain localized at the epigastric region  
• Small intestines, the proximal third of the colon and the appendix have pain referred to the periumbilical region  
• Bladder, uterus, and distal two-thirds of the colon cause pain in the left lower quadrant or suprapubic region  
• Retroperitoneal structures such as the aorta and kidneys often cause pain in the back |
| Onset                  | Acute-onset pain should alert the clinician to the possibility of an intra-abdominal catastrophe, especially a perforated viscous, a ruptured abdominal aortic aneurysm, or another vascular emergency |
| Radiation              | Helpful most of the time; for example, radiation of pain to the back in the case of ruptured aortic aneurysm |
| Intensity              | Severe pain should raise concerns about a serious underlying cause; however, older adults might have a serious intra-abdominal catastrophe with only mild pain |
| Duration and progression | Persistent, worsening pain is worrisome, whereas pain that grows less severe is typically favourable; serious entities generally present early, but delays may occur |
| Associated events      | Anorexia, vomiting, diarrhea, and urinary symptoms should be investigated; pain frequently precedes vomiting in surgical conditions |
| Aggravating and alleviating factors | Pain with movement means peritoneal irritation—this is a key feature to discern during the interview; pain with eating or fear of food signifies mesenteric ischemia; the patient should be asked about any self-treatments |
| Previous episodes      | Recurrent episodes generally point to a medical cause, with the exceptions of mesenteric ischemia (intestinal angina), biliary disease, and partial bowel obstruction |
ordered in cases with negative findings on ultrasonography, combined with a high clinical suspicion for cholecystitis. Delayed surgical treatment is associated with increased morbidity and mortality.\(^7\)

**Appendicitis**

Appendicitis is common in middle age; however, it is also the third most common indication for abdominal surgery in the older adult population. The mortality rate in the general population is <1%, whereas among older adults it ranges from 4–8%. Older adults account for half of all deaths from appendicitis.\(^8\)

Older adults with appendicitis tend to present late, and symptoms are atypical. Twenty percent of older adults who have appendicitis present after 3 days of symptoms, and another 5–10% after 1 week of symptoms.\(^9\) Classic symptoms of fever, anorexia, right lower quadrant pain, and leukocytosis are seen in <30% of older patients. So, nearly half of patients are afebrile, half demonstrate no rebound or involuntary guarding, and nearly one quarter have no right lower quadrant tenderness at all. Early surgical consultation should be obtained in suspicious or equivocal cases because delays in diagnosis lead to an increased risk for perforation, with resultant increases in morbidity and mortality.

**Small Bowel Obstruction**

Hernias and adhesions from prior surgeries are the most common causes of small bowel obstruction (SBO). The symptoms of SBO are usually typical. Abdominal pain, distension, and vomiting commonly are seen, accompanied by constipation. Diarrhea may be present because of hyperperistalsis distal to the obstruction. It remains the second most common condition (behind appendicitis) to be inappropriately discharged home. The mortality rate for SBO in the older adult population remains high at 14–35%. Although plain radiographs may show SBO, abdominal CT is more sensitive and may lead to the definitive cause of the obstruction.

**Pancreatitis**

Pancreatitis remains the most common nonsurgical abdominal condition in the older adult population. The incidence of pancreatitis increases 200-fold after the age of 65 years. Similar to most other abdominal conditions, the mortality rate among older adults is much higher than for younger adults, approaching 40% after the age of 70 years.\(^11\) The presentation among older adults is varied. It may present classically with a boring pain radiating to the back that is associated with nausea, vomiting, and dehydration. About 10% of cases of pancreatitis in older adults may present initially with hypotension and altered mental status. A CT scan should always be performed in an older adult with pancreatitis, especially if there are signs of impending sepsis.

**Peptic Ulcer Disease**

Pain is the presenting symptom in 50% of older adults with peptic ulcer disease. Complications are perforation, hemorrhage, gastric outlet obstruction, and penetration into an adjacent viscus. Rigidity is absent in nearly 80%.\(^12\) Free intraperitoneal air seen on plain radiographs is absent in 40% of patients who have perforation. When it is present, it is often best visualized on a lateral film, which frequently is not obtained. The mortality of perforation in the general population is approximately 10%, whereas in the older adult population it is 30% and increases eightfold if the diagnosis is delayed by 24 hours.

Hemorrhagic complications of peptic ulcer disease are also more common in older adults and more often require surgery and blood transfusions.

**Diverticular Disease**

Diverticular disease increases in prevalence with age. The incidence is approximately 50% among individuals older than age 70 years and 80% after age 85 years. Diverticular disease typically manifests as lower gastrointestinal bleeding or diverticulitis.

### Table 2: Changes to Vital Signs Indicating Possible Intra-abdominal Pathology

<table>
<thead>
<tr>
<th>Vital Sign</th>
<th>Change</th>
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<tbody>
<tr>
<td>Temperature</td>
<td>Often normothermic or even hypothermic</td>
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<tr>
<td>Heart rate</td>
<td>Tachycardia not often detected due to heart rate control medications (e.g., beta-blockers, digoxin, or calcium channel blockers) or intrinsic cardiac conduction system abnormalities</td>
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<tr>
<td>Blood pressure</td>
<td>Do not look for low or normal-appearing blood pressure; normal blood pressure may reflect significant hypotension for a patient who has chronic hypertension</td>
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<tr>
<td>Breathing rate</td>
<td>Tachypnea should be noted; though it may reflect the expected response to pain, it also may be a compensatory mechanism for progressive acidosis caused by sepsis or ischemic bowel</td>
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</table>
Large bowel obstruction (LBO) is usually caused by cancer, diverticulitis, or volvulus. Volvulus causes only 15% of cases of LBO but is more likely to require emergent surgical intervention. Symptomatology depends on the site of the volvulus. Sigmoid volvulus accounts for nearly 80% of cases and tends to present with a more gradual onset of pain. Selected cases of sigmoid volvulus can be managed nonoperatively by decompressing the bowel with a rectal tube placed by way of a sigmoidoscope.

Figure 1:
Large Bowel Obstruction: Volvulus

Physical examination
The abdomen should be assessed fully, paying attention to note scars of previous surgeries, distension, organomegaly, ecchymosis, masses, or bruits. The abdominal musculature is often thin in older adults, leading to less guarding and rigidity, even in the presence of frank peritonitis. A detailed search for hernias should be conducted because they may be a cause of bowel obstruction and strangulation.
The classic findings of nausea, dis-
tension, fever, palpable left lower quadr-
rant mass, and leukocytosis are fre-
quently absent. As with many other
conditions in this population, leukocyto-
sis may be lacking in a large number of
cases. Irritation of the bladder or ureter
by the inflamed diverticulum may induce pyuria or hematuria and result in the
erroneous diagnosis of nephrolithiasis
or urinary tract infection. Diverticuli-
tis may in turn result in abscess
formation, bowel obstruction, free perfor-
ration, or fistula and may be a cause of
overwhelming sepsis.

Diverticulosis is the most common
etiology of lower gastrointestinal bleed-
ing among older adults, and it may result
in massive bleeding. Unfortunately, it is
misdiagnosed 50% of the time.13 Abdom-
inal and pelvic CT scans can usually help
with the diagnosis. Early diverticulitis
and early appendicitis may be missed by
CT scan.

Vascular Catastrophes
Ruptured Abdominal Aortic Aneurysm
Ruptured AAA remains the 13th leading
cause of death in the U.S. The mortality
is extremely high. Although the diagno-
sis is fairly straightforward for the older
adult who has abdominal pain, hypov-
olemic shock, and a pulsatile abdominal
mass, this is the exception rather than the
rule. Hypotension is absent in nearly 65%
of cases, presumably because of tampon-
ade in the left retroperitoneal space.
Atypical presentations are common, and
the misdiagnosis rate is as high as
30–50%.

Individuals who have a ruptured
AAA often have back pain radiating
toward the groin; this is associated with
microscopic hematuria caused by irri-
tation of the ureter by the AAA. As a gen-
eral rule, any older adults presenting
with symptoms of new-onset nephrolithiasis should have an evalu-
ation of their aorta to detect AAA. This can
be accomplished using ultrasonography
or noncontrast CT scan, which is often
used to diagnose renal colic. Conditions
that are mimicked by ruptured AAA
include renal colic, diverticulitis, lower
gastrointestinal bleed (from an aortoen-
teric fistula), and acute coronary syn-
drome (if the patient presents with
syncope). Any patient who has had a pre-
vious aneurysm repair and who presents
with gastrointestinal bleeding must be
considered to have an aortoenteric fistu-
la until proven otherwise. Delayed diag-
osis increases mortality. The diagnosis
of AAA should be considered for any
patient who has syncope or hypotension
in combination with abdominal or back
pain.

Treatment decisions should be based
on the stability of the patient. Early con-
sultation with a vascular surgeon in sus-
ppected cases of AAA is essential. High-suspicion cases should be trans-
ferred to operating room emergently.

Advanced age is not a contraindic-
tion for repair. Mortality rates do not dif-
fer significantly with age, and AAA
rupture is uniformly fatal without surgi-
cal treatment.

Mesenteric Ischemia
Acute mesenteric ischemia is one of the
most difficult diagnoses to make. It
requires a high index of suspicion, cou-
pled with the willingness to image sus-
pected cases aggressively. It presents as
severe abdominal pain out of proportion
to the physical examination and may be
associated with vomiting and diarrhea.
Typically the patient has risk factors for
embolic disease, such as atrial fibrillation
or valvular disease. Patients who have
superior mesenteric artery thrombosis
typically have a long history of pain after
meals (intestinal angina) and may report
“food fear” and a subsequent weight
loss.

The physical examination is often
benign. Abdominal tenderness, peri-
toneal signs, and bloody stools are absent
early in the course until transmural
necrosis develops. No specific laboratory
studies have been found to date. A leuko-
cytosis is generally present, as are some
degree of metabolic acidosis and elevat-
ed lactate. Hyperamylasemia frequently
is seen, but clinicians should not be con-
fused with a diagnosis of pancreatitis.

Angiography remains the gold stan-
dard. The early, aggressive use of angio-
graphy is the only step that has been
shown to reduce overall mortality from
mesenteric ischemia.14 Treatment of acute
mesenteric ischemia is primarily surgical,
although there have been studies inves-
tigating intra-arterial thrombolitics,
vasodilators, and angioplasty.15,16

Extra-abdominal Causes
Older adults who have abdominal pain
often have causes for their pain located
outside of the abdominal cavity. The
most important is acute myocardial
infarction (MI). Older adults who have
acute MI frequently lack chest pain.
Nearly one-third of women older than
age 65 years have abdominal pain as
their presenting symptom of acute MI.17
Abdominal pain also may accompany
other cardiac causes, such as decompens-
ated heart failure, pericarditis, and endo-
carditis.

Pulmonary etiologies, including
lower lobe pneumonias or pulmonary
emboli, also may cause abdominal pain.
Pleural effusions, empyemas, and pneu-
mothoraces can mimic intra-abdominal
conditions. Endocrine conditions, such as
diabetic ketoacidosis, hypercalcemia,
and adrenal crisis, may result in nonspecific
abdomen pain. Herpes zoster, porphyr-
 ia, medication effects, and gynecological
or genitourinary conditions are addition-
al etiologies to consider.

Conclusion
Given the likelihood of atypical presen-
tations, unreliability of physical examina-
tion findings, and lack of sensitivity of
laboratory testing, the older adult who
has abdominal pain should be
approached systematically, keeping the
differential diagnosis broad and search-
 ing for potentially life-threatening etiolo-
gies. The clinician should keep in mind
that a lack of findings in the history, nor-
mal vital signs, and laboratory values
that are seemingly normal or laboratory
abnormalities that do not explain the
patient’s presentation are common
among older adults. Imaging and early
surgical consultation are encouraged.
Serial examinations and even serial labo-
### Key Points

Abdominal pain among older adults is a common complaint with broad differential diagnosis. Atypical and delayed presentation is common. The lack of abnormalities in vitals signs despite serious intra-abdominal causes. Repeat examinations and early surgical consult if the diagnosis is not clear. The threshold for an inpatient admission for older adults should be low.

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