

ED Legal Letter™

The Essential Monthly Guide to Emergency Medicine Malpractice Prevention and Risk Management
From the publishers of *Emergency Medicine Reports* and *ED Management*

American Health Consultants Home Page—<http://www.ahcpub.com> For more information, call (800) 688-2421.

CME for Physicians—<http://www.cmeweb.com>

EXECUTIVE EDITOR

James Hubler, MD, JD, FCLM, FAAEM, FACEP

Clinical Assistant Professor of Surgery, Department of Emergency Medicine, University of Illinois College of Medicine at Peoria; EMS Medical Director, Central Illinois Center for Emergency Medicine, OSF Saint Francis Hospital, Peoria, IL

EDITORIAL BOARD

Kay Ball, RN, MSA, CNOR, FAAN

Perioperative Consultant/Educator, K&D Medical, Lewis Center, OH

Robert Bitterman, MD, JD, FACEP

Director of Risk Management and Managed Care, Department of Emergency Medicine, Carolinas Medical Center, Charlotte, NC

Paul Blaylock, MD, JD, FACEP

Emergency Medicine Physician, Southwest Washington Medical Center, Emanuel Medical Center; Member, Board of Governors, American College of Legal Medicine; Retired of Counsel, Miller, Nash, Wiener, Hager & Carlsen, Attorneys at Law, Portland, OR

Theresa Rodier Finerty, RN, MS

Director, Emergency and Trauma Services, OSF Saint Francis Medical Center Peoria, IL

Jonathan D. Lawrence, MD, JD, FACEP

Emergency Physician, St. Mary Medical Center, Medical-Legal Consultant, Long Beach, CA

J. Tucker Montgomery, MD, JD, FCLM

Montgomery & Pierce, Knoxville, TN

Gregory P. Moore, MD, JD

Department of Emergency Medicine, Indiana University School of Medicine, Indianapolis

Jane A. Severson, RN, MS, MHSA,

University of Michigan Health System, Ann Arbor, MI

Daniel J. Sullivan, MD, JD, FACEP

Chairman, Department of Emergency Medicine, Ingalls Memorial Hospital; Associate Professor of Emergency Medicine, Rush Medical College, Harvey, IL

William Sullivan, DO, JD, FCLM

Clinical Instructor, Department of Emergency Medicine, Midwestern University, Downers Grove, IL; Clinical Assistant Professor, Department of Emergency Medicine, University of Illinois, Chicago

Jay C. Weaver, JD, EMT-P

Boston Public Health Commission
Emergency Medical Services; Adjunct Faculty, Northeastern University, Boston

Abdominal pain: Gut instinct not enough to make diagnosis

By **James Hubler, MD, JD, FCLM, FAAEM, FACEP**, Clinical Assistant Professor of Surgery, Department of Emergency Medicine, University of Illinois College of Medicine at Peoria; EMS Medical Director, Central Illinois Center for Emergency Medicine, OSF Saint Francis Hospital, Peoria, IL; **John W. Hafner Jr., MD, FACEP**, Clinical Assistant Professor of Surgery, Department of Emergency Medicine, University of Illinois College of Medicine at Peoria; Attending Physician, OSF Saint Francis Hospital, Peoria, IL.

Editor's note: Abdominal pain is a common presenting complaint in the emergency department (ED). The frequency of malpractice cases concerning abdominal pain is staggering. Due to the large volume of misadventures encountered and the unique disease processes in adult, pediatric, and obstetric/gynecologic emergencies, each will be covered separately. In coming months, ED Legal Letter will present a four-part series on abdominal pain. A two-part series presented in January and February will focus on emergency presentations of adult abdominal pain. In this issue, part one, cases of misdiagnosis of mesenteric ischemia, colonic volvulus, appendicitis and diverticulitis will be discussed. Part two in the adult series will cover gastrointestinal (GI) bleeding, aortic aneurysm, abdominal trauma, and extra-abdominal causes of abdominal pain. A future issue will address pediatric abdominal emergencies and their complications. Cases of pediatric intussusception, bowel obstruction, gastroenteritis, and Meckel's diverticulum will be discussed. Part four, presented later in the year, will highlight obstetric and gynecologic emergencies. The cases summarized in this issue should help ED clinicians sharpen their risk management strategies as well as their approach to the abdominal pain patient, and broaden readers' differential diagnoses and management of ED patients with abdominal pain.

Introduction

Abdominal pain is one of the most common ED presentations, accounting for 4%-8% of ED visits among adults.¹ A broad differential diagnosis must be entertained with every patient encounter. An accurate diagnosis of the ED patient with

abdominal pain mandates inclusion of all possible etiologies, including extra-abdominal conditions. Even by keeping a wide differential diagnosis, the determination of the exact etiology for abdominal pain in the ED setting can be difficult. However, with improvements in diagnostic technology, the proportion of undiagnosed emergency abdominal pain has dropped from 40% in the 1970s,² to 25% in the 1990s.³ The elderly, immunocompromised, intoxicated, or pregnant patient still remain a unique challenge for the emergency physician to diagnose. This issue of *ED Legal Letter* will illustrate several ED patient presentations abdominal pain that were complicated by an adverse outcome and ultimately led to litigation.

Case #1. *Gonzalez v. Poplawsky*⁴

On Jan. 5, 1997, 73-year-old Esther Gonzalez began experiencing severe abdominal pain, cramping, and repeated vomiting. Ms. Gonzalez presented to the ED and was seen by Dr. James Poplawsky. After a physical

exam and an abdominal x-ray, Dr. Poplawsky diagnosed a partial small bowel obstruction and recommended to Dr. Tenorio, her primary physician, that Ms. Gonzalez be admitted to the hospital for observation. She was admitted at about 10:30 p.m., and Dr. Tenorio issued several orders by telephone during the night, but he did not go to the hospital. At about 11 the following morning, Gonzalez went into full cardiac arrest and died. The autopsy report revealed acute mesenteric ischemia, an extensive small bowel infarction, and a perforation of the small bowel. These conditions led to peritonitis, which was thought to have ultimately caused Ms. Gonzalez's cardiac arrest.

Gonzalez's family sued Drs. Poplawsky and Tenorio, contending Ms. Gonzalez died because they failed to obtain a surgical consultation and to diagnose and treat her "life-threatening intra-abdominal pathology." In response, Drs. Poplawsky and Tenorio answered and moved for summary judgment, on the issue of causation. The crux of the defendant doctor's argument was that the mortality rate for Ms. Gonzalez's condition, mesenteric ischemia, is approximately 70%; and that no measures taken by the defendants would have increased Ms. Gonzalez's chance of survival above 50%. Consequently, their alleged negligence in failing to diagnose and treat her condition or to consult a surgeon was not a substantial cause of her death. The plaintiffs' expert, Dr. Louis F. Silverman, testified that the reliable medical literature establishes the mortality rate for mesenteric ischemia is 70%-80%. However, he testified that because of Ms. Gonzalez's history, coupled with her presenting complaints and the x-ray, Drs. Poplawsky and Tenorio should have: 1) put an ischemic bowel high on the differential diagnosis; and 2) consulted a surgeon, who would have performed a diagnostic laparotomy, and removed any compromised portion of the bowel. Had this been done, the plaintiff's expert Dr. Silverman opined, Ms. Gonzalez would have had a greater than 50% chance of survival.

In reaching this conclusion, Dr. Silverman did not rely upon any peer-reviewed studies or publications; rather, he based his opinions on his own clinical experience. However, he did not provide any data or case studies relating to his patients outcomes or his experiences, nor did he provide the trial court with testimony or documents establishing that his theory has been tested, studied, or generally accepted by the medical community. The defendants moved to

ED Legal Letter™, ISSN 1087-7341, is published monthly by American Health Consultants, 3525 Piedmont Road N.E., Bldg. 6, Suite 400, Atlanta, GA 30305.

Vice President/Publisher: Brenda Mooney
Editorial Group Head: Valerie Loner
Managing Editor: Allison Mechem
Production Editor: Nancy McCreary
GST Registration Number: R128870672.
Periodicals postage paid at Atlanta GA 30304.
POSTMASTER: Send address changes to *ED Legal Letter*, P.O. Box 740059, Atlanta, GA 30374.

Copyright 2003 by American Health Consultants. All rights reserved. No part of this newsletter may be reproduced in any form or incorporated into any information-retrieval system without the written permission of the copyright owner.

Back issues: \$77. Missing issues will be fulfilled by customer service free of charge when contacted within one month of the missing issue's date.

Opinions expressed are not necessarily those of this publication, the executive editor, or the editorial board. Mention of products or services does not constitute endorsement. Clinical, legal, tax, and other comments are offered for general guidance only; professional counsel should be sought in specific situations.



Now available on-line at www.ahcpub.com/online.html

Statement of Financial Disclosure

To reveal any potential bias in this publication, and in accordance with Accreditation Council for Continuing Medical Education guidelines, Dr. Hubler (executive editor and author); Advisory Board members Ball, Bitterman, Blaylock, Lawrence, Montgomery, Moore, Severson, Sullivan, and Weaver; and Hafner (author) have reported no relationships with companies having ties to the field of study covered by this CE/CME program.

Subscriber Information

Customer Service: (800) 688-2421

Customer Service E-Mail Address:
customerservice@ahcpub.com

Editorial E-Mail Address: allison.mechem@ahcpub.com
World Wide Web: <http://www.ahcpub.com>

Subscription Prices

United States: \$459 per year

Multiple Copies:
2-9 additional copies: \$367 each.
10+ copies: \$275 each.

Canada: \$489 per year plus GST
Elsewhere: \$489 per year

Accreditation

American Health Consultants is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide CME for physicians. American Health Consultants designates this CME activity for 18 credit hours of Category 1 of the Physician's Recognition Award of the AMA. *ED Legal Letter*™ is also approved by the American College of Emergency Physicians for 18 hours of ACEP Category 1 credit. This CME activity was planned and produced in accordance with the ACCME Essentials.

This continuing education program is sponsored by American Health Consultants, which is accredited as a provider of continuing education in nursing by the American Nurses Credentialing Center's Commission on Accreditation. Provider approved by the California Board of Registered Nursing for approximately 18 contact hours. Provider #CEP10864.

Questions & Comments

Please contact Allison Mechem,
Managing Editor, at
allison.mechem@ahcpub.com
or (404) 262-5589.

exclude Silverman's causation testimony as unreliable, stating that Dr. Silverman's opinions were nothing other than "subjective belief or unsupported speculation." The trial court struck Dr. Silverman's testimony and granted the defendants' motion for summary judgment. The family appealed the decision; however, the appellate court agreed with the trial court, and the case was affirmed.

Discussion

This case illustrates the fact that plaintiff's attorneys do not have to look very hard to find an expert to support a position and testify against emergency clinicians. Fortunately, the treating physicians were exonerated, but not before they had to endure a long and painful lawsuit.

Acute mesenteric ischemia occurs when there is an interruption of blood flow and oxygen delivery to the gut, resulting in bowel infarction and necrosis. Even despite aggressive diagnosis and treatment strategies, the disease carries a high mortality rate of between 50%-70%.⁵ A variety of conditions may be responsible for the arterial insufficiency to the gut, including mesenteric arterial occlusion, mesenteric venous occlusion, and nonocclusive processes. Embolization of the superior mesenteric artery, most often from mural thrombi or cardiac vascular lesions, accounts for about 50% and thrombosis of a pre-existing atherosclerotic vessel lesion accounts for 25% of all mesenteric ischemic events, respectively.⁶ Nonocclusive mesenteric ischemia (NOMI) is responsible for approximately 20%-30% of acute mesenteric ischemic episodes, and usually is due to mesenteric vasospasm from either excessive sympathetic activity during cardiogenic shock or hypovolemia.⁷

The key to successful management of acute mesenteric ischemia is early diagnosis and treatment. Patients classically present with pain out of proportion to their abdominal examination findings. The danger in this life-threatening disease is that early on, the abdominal exam will lack peritoneal findings such as rebound or guarding. The syndrome may appear as a sudden onset of severe symptoms and decompensation over a period of hours, such as in the case of a superior mesenteric artery occlusion from embolization, or it may present with a more insidious onset coupled with nonspecific abdominal pain and nausea or vomiting, such as with a venous occlusion. Eventually, as the ischemia continues and

the syndrome progresses, the abdomen will become distended, exquisitely tender, and lose all bowel sounds.⁸

Ancillary testing may be helpful, with lab tests possibly revealing a left shift in the white blood cell count, a persistent base deficit metabolic acidosis (due to a lactic acidosis), an elevated measured serum lactate level, and possibly, changes in the serum amylase, creatine phosphokinase or alkaline phosphatase.⁹ Plain abdominal x-rays occasionally are helpful in excluding other conditions causing the patient's abdominal pain, such as a perforated viscus or a small bowel obstruction. Subtle signs of acute mesenteric ischemia may be visible on plain abdominal radiograph and include ileus or bowel wall thickening, while pneumatosis of the bowel wall or portal vein gas may be seen with advanced stages of the disease. The emergency physician should be cautious, however, as normal plain abdominal radiographs have been reported in more than 25% of patients with acute mesenteric ischemia.¹⁰

Advanced radiographic techniques also may be used for identifying mesenteric ischemia. A computed tomography (CT) scan of the abdomen may be helpful in identifying acute mesenteric ischemia. CT can identify all focal or segmental bowel wall thickening, pneumatosis intestinalis, or portal vein gas. In addition, thrombus within the mesenteric veins or nonenhancement of the arterial vasculature also may be seen.¹¹ Recent studies have reported CT sensitivity for detecting acute mesenteric ischemia between 64% and 82%.¹² The gold standard for confirming suspicions about mesenteric ischemia remains angiography. In addition to the visualization of the patient's entire mesenteric vascular anatomy, interventions may be attempted, such as intra-arterial thrombolytics, vessel angioplasty, or intra-arterial vasodilators.¹³

For the emergency clinician strongly suspicious of acute mesenteric ischemia, the confirmation of the disease is less important than ensuring proper consultation and prompt initial resuscitation and management. Many authorities contend that angiography is a critical procedure for diagnosing mesenteric ischemia; however, this should be performed in collaboration with a surgical consultation so that the patient quickly can undergo surgical laparotomy, if indicated. Optimistic reports have noted that with prompt and aggressive surgical management, a 55% overall survival rate is possible (75%-90% if patients present within 12 hours).¹⁴

More importantly, negative laboratory studies, plain abdominal films, or abdominal CT scans do not “rule out” mesenteric ischemia in a patient with risk factors (smoking, peripheral vascular disease, atherosclerosis, and advanced age) or a history and physical exam strongly suspicious for mesenteric ischemia. Moreover, plain abdominal radiographs may show an ileus or bowel obstruction and offer false reassurance.¹⁵ As was the case for Ms. Gonzalez, the plain films revealed a partial small bowel obstruction that swayed her doctors away from her true diagnosis.

In no way do the authors intend to create a standard of care that every elderly patient presenting to the ED with nonspecific abdominal pain should receive a radiologic imaging study. In patients with severe abdominal pain or abdominal pain out of proportion to their physical exam, the possibility of acute mesenteric ischemia, or other intra-abdominal catastrophes, always should be considered. For patients with severe symptoms, especially elderly patients, early involvement of a surgeon is a far more important key to successful management than radiographic imaging. An experienced surgeon evaluating abdominal pain is equivalent to a highly sensitive and specific laboratory test.¹⁶ Elderly patients with abdominal pain have a much higher risk for life-threatening conditions and more often present with subtle and atypical complaints.¹⁷ Pre-existing conditions, stoicism, medications such as steroids and pain relievers, and communication difficulties often interfere with the physical examination in elderly patients.¹⁸

A roadblock in the rapid and accurate ED diagnosis of abdominal pain is encountered when a patient presents with mild nonspecific symptoms and a soft abdomen without peritoneal signs. This presentation again often happens in the elderly patient, and their workup and diagnosis require more time and ED resources than those in younger patients.¹⁹ However, with the growing trend of increased elderly ED patients, radiologic imaging in a cost-effective manner must be considered. Eisenberg and colleagues prospectively studied the effective use of radiographic imaging in 1780 cases of ED abdominal pain and proposed limiting abdominal radiographs to those presenting with moderate to severe abdominal tenderness, or to patients with a high suspicion of bowel obstruction, renal-ureteral calculi, trauma, bowel ischemia, or gallbladder disease if ultrasonography is

not readily available.²⁰ Abdominal sonography has been shown to be a valuable, rapid, and noninvasive test for accurately diagnosing biliary, hepatic, pancreatic, aortic, and renal pathology.²¹ A prospective study of 40 patients with atypical and difficult abdominal presentations found that the CT scan changed the primary therapeutic strategy in 30% of cases.²² When using radiologic testing, as in all testing, the test should be coupled with the history and physical examination to be utilized most effectively.

Case #2. *McKay v. Hardin Memorial Hospital*²³

Scott McKay enjoyed good health despite his episodes of irritable bowel syndrome and depression. As a result of his irritable bowel problems, Mr. McKay already had been tested twice by sigmoidoscopy and several barium enemas before the age of 30.

On the morning of Friday, Sept. 29, 1995, Mr. McKay awoke with his usual pain and cramping, went to the bathroom and took a shower, ate breakfast, and went to work. On his way to work, the cramping and pain increased, and upon arrival, he had multiple episodes of diarrhea. He then became very diaphoretic and lightheaded and asked that an ambulance be called. While waiting for the ambulance Mr. McKay fainted.

Upon arrival, emergency medical technicians found Mr. McKay “lying on [a] first-aid bed complaining of pain to the upper right quadrant and tenderness to the upper left quadrant” of his abdomen. He was transported by ambulance to Hardin Memorial Hospital (HMH) for treatment. Immediately upon arrival to the ED, a nurse took his vital signs and patient information. Dr. Victor Angel, the physician on duty in the ED that Friday took his medical history and examined the plaintiff. When examining Mr. McKay, Dr. Angel noticed that Mr. McKay had a diffuse abdomen, tenderness, guarding, rigidity, and rebound. Dr. Angel felt he might have had a “borderline surgical abdomen.” Dr. Angel ordered blood tests and plain abdominal x-ray. The blood tests revealed a normal white blood cell count.

Dr. Cherukuri, the radiologist on duty that Friday at HMH, reviewed and interpreted Mr. McKay’s x-rays. Dr. Cherukuri found some retained feces in the right portion of the colon, no significant amount of retained feces in the left portion of the colon, no free abdominal air, and no evidence of obstruction. His

recorded impressions were that “no significant abnormalities were present in the abdomen except for some retained feces in the right quadrant.”

After reviewing the abdominal x-rays and blood tests, Dr. Angel informed the plaintiff that “[he] was full of it,” implying constipation was the reason behind his abdominal pain. Mr. McKay replied, “I’ve been constipated before, but this is different.” Dr. Angel reassured him not to worry and that he would relieve the constipation and pain by administering an enema.²⁴

About 15 minutes later, a nurse moved the plaintiff to the rear of the ED and placed him on the toilet located there. Several minutes later another nurse placed an IV and instructed Mr. McKay how to self-administer an enema. Due to the pain, he complained he was unable to administer the enema himself and asked for assistance from the nurse. The nurse refused to help, and he was forced to administer the enema himself. Almost instantaneously, his pain increased, and he reported to the nurse: “I [am] in pain . . . it [is] just unbearable, . . . please go get the doctor.”²⁵ The nurse told him she’d try, but subsequent testimony revealed that neither she nor Dr. Angel ever returned. In addition the plaintiff testified that he was never removed from his sitting position on the toilet and the next individual he saw was his fiancée — a psychiatrist, Dr. Vonderembse, at 5:30, nearly three hours later.

However, Dr. Angel and several additional nurses testified that the vitals signs were continuously monitored and Dr. Angel himself periodically looked in on him. However, it is undisputed that Dr. Angel did not physically examine the plaintiff again after the initial intake and no further vitals were documented between the time the enema was administered and the time Dr. Vonderembse arrived. Dr. Vonderembse went to seek out Dr. Angel and found him eating dinner. They discussed his condition, and Dr. Angel testified that he told Dr. Vonderembse that he wanted to admit the plaintiff but he refused. Dr. Vonderembse, however, testified that Dr. Angel told her that he felt admission was warranted but that the on-call surgeon wouldn’t be available to evaluate the plaintiff until the next morning.

Dr. Vonderembse returned to Mr. McKay’s area and informed him that he would not be seen by a surgeon until the morning and asked him if he wished to go to Fremont Memorial Hospital (FMH), the hospital where Dr. Vonderembse worked and

where the plaintiff had previously been a patient. He agreed, and Dr. Vonderembse drove the plaintiff to FMH. Subsequent to his arrival and evaluation at the FMH ED, he was diagnosed with severe appendicitis and scheduled for emergency surgery.

During surgery it was discovered that the plaintiff’s condition wasn’t the result of appendicitis but rather a sigmoid volvulus (a twisting of the sigmoid colon). The sigmoid colon had twisted completely and was ischemic and gangrenous. As a result, the sigmoid tissue had lost its integrity and the colon had perforated, releasing fecal matter into the abdominal cavity and causing peritonitis. He was in the hospital for several days. However, shortly after his release, Mr. McKay developed ARDS (adult respiratory distress syndrome) and immediately was readmitted and placed in the intensive care unit. His condition worsened and he subsequently decompensated into a coma. Mr. McKay eventually recovered but not before undergoing at least three more surgeries and extensive physical and mental therapy. He lost two years of wages and had extensive medical bills totaling more than \$350,000. Sometime after his recovery, Mr. McKay and Dr. Vonderembse broke off their engagement, allegedly due, in large part, to his illness.

On Sept. 3, 1996, Mr. McKay filed a complaint in the Common Pleas Court of Hardin County against HMH, Dr. Angel, and M.E.F. Inc., alleging negligence and praying for relief in the amount of \$2 million. After several years of discovery, miscellaneous motions, and dismissal of several defendants, the trial finally commenced on June 5, 2000, against M.E.F, HMH, and Dr. Angel. Each party presented the testimony of several witnesses, including expert testimony by doctors and nurses. After eight full days of testimony and arguments, the jury returned a verdict for the defendants. Three-quarters of the jury found that HMH was not negligent, that Dr. Angel was not negligent, and further, that Mr. McKay was not negligent for his outcome. On July 17, 2000, the trial court entered judgment. Mr. McKay attempted an appeal but was unsuccessful.

Discussion

This case was a nightmare that created five years of headaches for the treating physicians due to the ensuing litigation. Although Dr. Angel won in his defense in this case, the treating physician was guilty of search-satisfying bias and “thinking inside the box.” Dr. Angel

used a vertical line, straightforward approach to the patient's complaint, leading him to a rigid diagnosis and plan. While this approach emphasizes economy and efficacy, it may lead to reduced flexibility in situations requiring more lateral thinking.²⁶ Scott McKay's history of irritable bowel syndrome, chronic constipation and recurrent abdominal pain led the physician to an erroneous diagnosis (although not a negligent one). Search-satisfying bias involves calling off the search once something is found. This cognitive error can lead to significant further findings being missed. An example is missing a second or third fracture present on an x-ray, once the first is diagnosed. When a minimal amount of stool was noted on the plain abdominal x-ray, the diagnosis of constipation was "confirmed" despite the marked differences in Mr. McKay's symptoms from his usual chronic complaints.

Several elements regarding documentation can help defend these types of malpractice cases. First, documenting comments by patients of "this is my typical symptom" of irritable bowel, constipation, etc., will help defend the case if the diagnosis is incorrect. Remember, in this case, Scott McKay noted that this pain was different. When a patient says that his symptoms are different, this is a definite red flag that should alert ED clinicians to look for alternative diagnoses. Second, an argument could be made that it is not impossible (although rare) to encounter patients with constipation that have guarding or rebound (peritoneal signs). The key is documenting rechecks and resolution of peritoneal findings prior to discharge of the patient. Third, if a patient is offered admission and refuses, documentation must occur. Vital signs, patient rechecks, and repeat examinations must be documented in the patient chart. All too often, emergency clinicians recheck the patient, reassuring them and the patient of a diagnosis, but forget to write it in the chart. Do not wait until depositions and trial to argue this issue. The presumption is that: "If you did not document it, you did not do it." Although it is a rebuttable or defensible presumption, since a physician or nurse can argue that a recheck was done, juries greatly favor documentation in the patient chart. As an exercise, ED clinicians should pull several charts of their own or a partner. Imagine that the patient was misdiagnosed, and attempt to defend it.

The plaintiff's attorney often will try to discredit defendant doctors and incense the jury; for example, note that Dr. Vonderembse alluded to her conversation

with Dr. Angel interrupted his dinner. Also, this case recorded some comments by the treating physician — while undoubtedly not malicious in intent — that could have adversely affected the case. The alleged conduct of the nurse in not assisting with the enema and abandoning the patient on the toilet could have instigated an enormous jury verdict. Fortunately, the plaintiff's attorney did not focus on the unavailability of a surgeon and the delay this may have created, if it is believed to be a true allegation since these facts were disputed in the case.

Volvulus of the colon accounts for 10%-13% of all bowel obstructions in the United States, and its incidence is estimated at three per 100,000.²⁷ It results from a segment of bowel rotating around its mesenteric axis producing obstruction of the lumen of the bowel and vascular compromise to that section of the bowel. Sigmoid volvulus represents 60% of colonic volvulus and occurs primarily in either elderly inactive patients or patients with severe psychiatric or neurologic disease. Usually there also is a history of chronic constipation, and it is thought that this leads to debilitation and lengthening of the chronically distended colon. This process then can produce a redundant sigmoid loop attached by a narrow mesenteric root allowing for easy torsion.²⁸ Early in the disease course, patients with sigmoid volvulus present with lower abdominal pain and cramping that may progress to abdominal distention, nausea, vomiting, and obstipation. Patients also may relate similar previous complaints that resolved spontaneously when the patient defecates or passes flatus. Patients typically present late in the course of the disease (days into illness), and may have strangulated bowel upon presentation. Even if strangulated bowel is present, it is rare for bowel perforation to occur, due to the chronic bowel wall thickening that occurs over the course of the disease.²⁹

The most valuable test in diagnosing colonic volvulus is the plain-film radiograph of the abdomen. It is a cost-effective and rapid means to confirm the diagnosis in 80% of cases. Findings include a dilated single loop of colon in the left half of the abdomen, with the loop pointing superiorly and both ends in the pelvis.³⁰ In subtle cases, a barium enema may demonstrate a pathognomonic twisted "bird's beak" or a CT scan of the abdomen may show a "whirl sign." An interesting element of this case was the abdominal plain-film x-ray was not supportive of an acute volvulus or even an obstructive pattern as interpreted by the radiologist during the patient's initial evaluation.

Forty percent of sigmoid volvulus cases in children and adolescents are misdiagnosed as irritable bowel syndrome and chronic constipation, and may be treated inappropriately for years. This is possible because the volvulus often spontaneously reduces itself and the symptoms resolve.³¹ It is unknown whether, in the younger population, the symptom of chronic constipation predisposes to volvulus, or results from it. In this age group a pathologically long colonic mesentery is an important associated factor. Being so young and without any risk factors for volvulus, Mr. McKay may have fit into this clinical population rather than the traditional patient with the disease.

The therapy of choice for a nonstrangulated sigmoid volvulus is an acute rectal tube sigmoidoscope for decompression and detorsion. This mechanism is successful in 85%-95% of attempts with an associated mortality rate of 2%.³² Either a failed decompression or a suspicion of strangulated bowel (i.e., high white count, peritoneal signs, fever, hemodynamic decompensation) requires an immediate laparotomy and open reduction. The recurrence rate after nonoperative reduction approaches 90%; therefore, it is recommended that an elective sigmoid resection also be performed.³³ ED physicians should remember to perform a hernia exam in males with abdominal pain of uncertain etiology to evaluate for this cause of intestinal obstruction.

Case #3. *Davis v. Immediate Medical Services*³⁴

Mr. Davis began experiencing pain in his right lower abdomen on April 7, 1991. Concerned about her husband, Mrs. Davis consulted a medical book at home. After reading the book, Mrs. Davis felt that her husband's symptoms were indicative of appendicitis. The couple went to Immediate Medical Services Inc. (IMS). At this emergency care facility, Dr. Barbara Guarnieri, defendant, examined Mr. Davis, took a history, and performed a number of tests. Dr. Guarnieri was employed by Alliance Immediate Care Inc. (AIC), which had a contractual relationship with IMS.

The Davises told Dr. Guarnieri of their suspicion of appendicitis. After examining Mr. Davis and concluding that the tests did not indicate appendicitis, Dr. Guarnieri diagnosed a urinary tract infection, a condition that Mr. Davis had said he had suffered from a few years earlier. Dr. Guarnieri prescribed antibiotics and told Mr. Davis that he should consult

his own physician if he did not feel better in a couple of days.

Although he took the medication prescribed by Dr. Guarnieri, Mr. Davis's illness continued after his initial visit. Two days later, Mr. and Mrs. Davis went to the ED at defendant Alliance Community Hospital. While there, Dr. Geno Serri treated Mr. Davis. Mr. Davis told Dr. Serri that he was experiencing lower abdominal pain, which had not subsided, and again expressed his concern that it was appendicitis. Dr. Serri examined Mr. Davis and ordered additional tests, eventually diagnosing abdominal pain of uncertain etiology. He told Mr. Davis to complete the course of antibiotics, and also gave him a prescription for pain medication. Dr. Serri also contacted Mr. Davis's family physician, Dr. William Eichner, and told the couple to schedule a follow-up appointment with him. On April 15, 1991, they visited Dr. Eichner and told the doctor that he felt better that day but had experienced some cramping over the weekend. Dr. Eichner concluded that Mr. Davis had a urinary tract infection with resolved symptoms of gastroenteritis. Dr. Eichner prescribed medication for stomach discomfort and scheduled Mr. Davis for a follow-up visit for April 30, 1991.

Eight days later, on April 23, 1991, Mr. Davis returned to the ED at Alliance Community Hospital with severe pain and difficulty breathing. Dr. Serri again examined Mr. Davis. Mrs. Davis requested that Dr. Serri contact Dr. Duane C. Kuentz, her physician. Dr. Kuentz arrived at the hospital at approximately 3:30 p.m. and determined that Mr. Davis was suffering from multiple abdominal abscesses, which may have resulted from a ruptured appendix. At 5 p.m., Dr. Kuentz contacted a general surgeon, Dr. William Fiegenschuh, to consult about possible surgery. Dr. Fiegenschuh arrived at the hospital around 9 p.m. that evening but determined that Mr. Davis needed to be stabilized before surgery could occur on the following day. Dr. Fiegenschuh eventually performed an exploratory laparotomy around 1 p.m. the following day. Dr. Fiegenschuh discovered and drained the abscesses. He also removed the appendix, which had ruptured. Despite surviving the surgery, Mr. Davis could not withstand the infection that had resulted from the burst appendix, and died the next day, April 25.

The jury eventually returned verdicts in favor of all the above defendants except for the family physician, Dr. Eichner, who was found liable in the amount of \$643,000. The Court of Appeals affirmed the judgment in part and reversed it in part. The state Supreme Court

heard the appeal and ordered a new trial against EM Care, Dr. Guarnieri and IMS.

Discussion

All too often patients present to the ED with a preconceived diagnosis they are suspicious of, such as appendicitis, meningitis, or myocardial infarction. As in this case, Mr. Davis's wife read a medical book, became suspicious of her husband's symptoms and was ultimately right that he had appendicitis. This does not signify that there was negligence on the part of the treating physician in misdiagnosing Mr. Davis's abdominal pain. However, every clinician should presume that his or her decisions and actions (or omitted actions) may one day have to be defended to a jury. Missed appendicitis is one of the five leading causes of litigation against emergency physicians, accounting for about 5% of the total dollars awarded.³⁵ There are hundreds of cases annually brought forth regarding missed appendicitis. This case should remind physicians to always include appendicitis in the differential diagnosis of abdominal pain and attempt to exclude this possibility in a reasonable fashion.

Unfortunately this case has many similarities with other "missed appendicitis" cases. This patient was seen multiple times by several different physicians, as with 30% of all the total missed appendicitis cases.³⁶ Often a catchall diagnosis for the patient's abdominal pain, such as gastroenteritis, is attached to the patient and prolongs the misadventure. This practice should be avoided and substituted with a descriptive diagnosis such as "abdominal pain of undetermined etiology." Patients presenting to the ED for a second visit regarding continued or changing symptoms represent an opportunity to correct any previous mistakes. These patients represent a high-risk population and should be approached with a suspicious and open mind, as to avoid complicating the case with the previous treating physician's elicited history and actions. As a general rule of thumb, patient's presenting with the same or advancing complaints should receive a more in depth work-up than they received on their previous visit. Although appendicitis is an infrequent disease in the elderly population overall, atypical presentations involving minimal abdominal pain, mental status changes, hypothermia, or hypotension are more common.³⁷ The minimal signs and symptoms can result in a longer delay in diagnosis and an increased

incidence of perforation.³⁸ In this population, imaging studies, such as a CT of the abdomen, or surgical consultation may be helpful in diagnosing the condition.

Urinalysis abnormalities in the patient with appendicitis are not rare, and have been documented in 19%-40% of cases.³⁹ Patients with a retrocecal appendix often have inflammation of the ureter and may have both red and white cells present in the urine. However, the presence of more than 30 red blood cells (RBCs) or more than 20 white blood cells (WBCs) should prompt the ED physician to consider more urinary tract etiologies for the patient's abdominal pain.⁴⁰ Similarly, the value of the serum leukocyte count in distinguishing cases of appendicitis has been a source of much debate between surgeons and ED physicians. A WBC count greater than 10,000, with more than 75% having neutrophilia, has been documented in 70%-90% of patients with appendicitis.⁴¹ While this may be a sensitive finding for appendicitis, it is not at all specific, as many intra-abdominal processes cause elevation of the WBC count. In addition, the WBC count may be normal in 10% of all appendicitis patients, and 20%-42% of elderly appendicitis patients.⁴² The WBC count may be more useful when applied in series, as one study demonstrated 92%-100% sensitivity in diagnosing appendicitis when second measurement was obtained four to eight hours after admission.⁴³ Overall, the ED physician should not place an exaggerated emphasis on the white blood cell count. (*See ED Legal Letter December 1996, pp. 113-124, for an in-depth analysis and lengthy discussion on missed appendicitis.*)

Case #4. *Hofstrom v. Share*⁴⁴

On Monday, March 12, 1990, plaintiff Margaret Hofstrom, age 25, was treated by defendant Dr. Jerold M. Share in the ED at West Jersey Hospital-Voorhees Division. Her chief complaints were abdominal pain, nausea, vomiting, and pain upon urination. Her vital signs were normal except for her temperature of 99.6° (at home she reported it had been as high as 101°). Dr. Share's physical examination revealed normal bowel sounds, diffuse tenderness upon palpation, no masses, and no guarding. She had "pronounced left-sided costovertebral angle tenderness" and jumped when that area was percussed. A urinalysis demonstrated that there were four to six WBCs per high-powered field. Based upon the urinalysis and the patient's history and

physical examination, Dr. Share diagnosed Ms. Hofstrom with a pyelonephritis. He discussed the diagnosis with plaintiff and prescribed an antibiotic. He advised plaintiff to follow up with her own physician within two days. He further advised her to return to the ED if her condition worsened in any respect.

At around 2 a.m. on Wednesday, March 14, 1990, Mrs. Hofstrom awoke with chills and a fever. Later that morning, her pain worsened. She was brought to the hospital, and eventually was diagnosed as having appendicitis. During the ensuing emergency surgery, it was determined that plaintiff actually had diverticulitis complicated by a perforated bowel, which required a temporary colostomy for about five months. The plaintiff suffered extensive scarring as a result of the surgery and complained of continued abdominal pain. Based upon the misdiagnosis and incorrect interpretation of the urinalysis, Mrs. Hofstrom sued Dr. Share and West Jersey Hospital for negligence.

The plaintiff's medical expert, Dr. David Befeler, testified that Dr. Share deviated from accepted medical standards. In his opinion, Dr. Share failed to appreciate that the urinalysis results were normal and did not indicate urinary tract infection. Consequently, Dr. Share was further negligent in not ordering a urine culture and a complete blood count, and in discharging the patient without having the results of those tests. Dr. Befeler admitted, however, that diverticulitis was a highly unlikely diagnosis considering plaintiff's history and the results of the physical examination. He further conceded that it was reasonable for Dr. Share to consider urinary tract infection, especially since diverticulitis is unusual in young people. He agreed that the plaintiff's condition at the ED on Monday did not indicate a need for surgery. Finally, he testified that, in accordance with Dr. Share's discharge instructions, the plaintiff should have returned to the ED as soon as she experienced a deterioration of her condition Wednesday morning. In support of part of Dr. Befeler's testimony, the plaintiff presented Dr. John C. Baylis, chairman of the pathology department and director of the medical laboratory at West Jersey Hospital. He said that the plaintiff's urinalysis test results essentially were normal.

Dr. Share explained the reasons for his diagnosis of urinary tract infection and why he did not perceive this as a case of diverticulitis. He explained that diverticulitis is "exceedingly rare" in women 25 years of age, and that 90%-99% of women who are 25 years old and present with urinary complaints have an infection of

the urinary tract. He noted that pain on urination is uncommon with diverticulitis and that nausea and vomiting occur in only 20% of diverticulitis cases. The plaintiff's normal and active bowel sounds, the lack of change in bowel habits, and the absence of a previous history of diverticulitis, all indicated to him an absence of that illness. Diverticulitis usually is reflected by pain located in the abdomen's lower left quadrant, whereas plaintiff had diffuse pain. Additionally, the plaintiff had pronounced pain in the left side of her back (near her kidneys) that indicated an infection in the upper urinary tract. He thought the urinalysis confirmed his leading diagnosis because each analyzed field had at least four white cells, which he believed was abnormal.

Dr. Share further explained that he did not order a urine culture because it would not have changed his management of the patient, since he believed it took 48-72 hours to get the results back. He testified that a culture normally is not ordered for a younger patient and that he would have ordered it later if she had returned with no improvement. He further explained that his treatment was not complete and that his instructions to follow up with her primary physician within two days and to return earlier if increased pain or fever occurred were related to his differential diagnosis. In Dr. Share's view, a complete blood count would have been inappropriate because the outcomes would have been either "normal," "slightly elevated," or "very elevated." The first two possibilities, he said, would not have changed his treatment and would not have helped with the diagnosis. A "very elevated" reading would have meant that a severe illness was present which was entirely inconsistent with plaintiff's condition as he observed it.

Dr. Julius Kaplan, defendant's expert witness, stated that diverticulitis is uncommon in people younger than age 50, rare in those younger than 40, and extremely rare for people younger than 30. He agreed that the most likely diagnosis was urinary tract infection. In his view, an ED physician would not have considered diverticulitis as a differential diagnosis in the circumstances of this case. Even though the lab report listed zero to five WBCs as normal for the lab, because there were white cells in every field, and that indicated an abnormal condition. He believed the urinalysis gave credence to Dr. Share's diagnostic impression. Dr. Kaplan further agreed a urine culture and/or blood count were not indicated.

Defense counsel introduced as a major theme in this trial the negligence of plaintiff Margaret Hofstrom in

failing to adhere to the instructions she received from Dr. Share. The appellate court believed that “what occurred here is analogous to the situation where an attorney persists in making unwarranted prejudicial appeals to a jury which taints the verdict. In such circumstances, a reversal is in order.”

The court reversed the order of the lower court and granted plaintiff patient a new trial in her medical malpractice action against the defendant physician, because the trial court erred in failing to instruct the jury to ignore defendant’s allegations of plaintiff’s contributory negligence.

Discussion

Unfortunately, a recurrent theme of long jury trials and appeals persists in this case. Dr. Share is left with the option of settlement or a long and painful retrial. Dr. Share’s treatment was not outside the standard of care in this case. The history and physical exam of this patient pointed to that of urinary tract infection. This case is the second presented where a young patient has a disease process that usually is reserved for the older patient.

Diverticulitis occurs when there is an inflammation of a colonic diverticulum, a condition known as diverticulosis. Diverticulosis is a disorder of colonic muscle function, where increased muscle tone results in saclike protrusions (diverticulae) of the colonic mucosa through the muscularis layer. These diverticulae occur at relatively weak spots in the muscular wall of the bowel, and most often occur in the sigmoid colon.⁴⁵ Diverticular disease (both diverticulosis and diverticulitis) is related to advancing age: 50% of persons age 65 and 65% of persons age 85 years will have diverticula.⁴⁶ Diverticulae seem to be linked to a Western diet, especially a highly refined, low-fiber diet.⁴⁷ Patients with diverticulosis may have recurrent, intermittent, but usually nonpersistent left lower quadrant abdominal pain and tenderness, although 10%-20% of patients with diverticula will not develop any symptoms from the condition.⁴⁸ Diverticulitis represents the most common complication of diverticular disease. This complication is age-related, as only 2%-4% of patients with diverticulitis are younger than age 40.⁴⁹ Diverticulitis occurs when an already present diverticulae becomes obstructed, most often by a fecolith, and subsequent inflammation and swelling compromise the diverticulae’s blood supply. This inflammatory process can lead to

either microperforation or full perforation of the colonic wall. This small perforation can be confined to the bowel by the serosa, as in peridiverticulitis, or may form either a local abscess or frank peritonitis.⁵⁰

While plain abdominal films generally are not considered helpful, they may show a nonspecific ileus pattern or mild distension.⁵¹ The radiographic test of choice to identify diverticulitis and its associated complications is an abdominal CT scan with oral and IV contrast. The CT especially is helpful in situations where the abdominal pain is of unclear etiology, as often occurs with the elderly. Most episodes of diverticulitis may be resolved with bowel rest, IV fluids, and antibiotics. Any evidence of generalized peritonitis, bowel perforation, or gas in the bowel wall requires immediate laparotomy. Stable patients with evidence of intra-abdominal abscess may also undergo CT guided percutaneous catheter drainage performed by an interventional radiologist in conjunction with aggressive IV antibiotics.⁵²

ED physicians must be careful not to interpret a test in a way that does not fit a particular diagnosis. A urinalysis should be performed in all women whose chief complaint is abdominal pain. A pregnancy test is mandatory if the patient is of childbearing age (a pregnancy test is indicated even if the patient has had a tubal ligation). A urine culture is not necessary to diagnose a urinary tract infection, as most will respond to empiric antibiotic treatment. Patients that should have a urine culture sent include: patients with acute pyelo-nephritis; patients with epidemiologic risk factors for subclinical pyelonephritis; hospitalized patients; those with a chronic indwelling catheter; pregnant women; children; and adult males.⁵³ Diagnosing the etiology of non-specific abdominal pain in the nonpregnant female of childbearing age is often a difficult challenge. While a negative laparotomy rate for appendicitis of 15%-20% is considered optimal, women of childbearing age have negative laparotomy rates between 34%-45%. Moreover, 33% of such women are misdiagnosed on their initial ED visit.⁵⁴ Additional reports have suggested that in women of childbearing age with lower abdominal pain the CBC rarely altered patient management or diagnosis.⁵⁵

Conclusion

Abdominal pain can be a challenging complaint to accurately diagnose in the ED and may represent

several life-threatening processes. The ED practitioner can benefit from an expanded differential diagnosis that incorporates life-threatening conditions primarily. The selected use of laboratory and radiologic adjuncts, in addition to possible specialist consultation, improves the likelihood of a timely and accurate diagnosis. The ED clinician should keep an open and suspicious mind regarding abdominal pain, especially in the elderly, women of childbearing age, the immunocompromised, and in the patient with a repeat visit. Thorough documentation of the patient's history, physical exam, ED course, and disposition is an important medicolegal concept that will be invaluable if a patient sustains complication from their treatment. In the forthcoming months, we will continue to explore this challenging and important area of emergency medicine.

Endnotes

1. Colucciello SA, Leukins TW, Morgan DL. Assessing abdominal pain in adults: A rational, cost-effective, and evidence-based strategy. *Emergency Medicine Practice*. 1999;1:1-20.
2. Brewer R, Golden F, Hitch D, et al. Abdominal pain. An analysis of 1000 consecutive cases in a hospital emergency room. *Am J Surg* 1976;131:219-223.
3. Powers RD, Guertler AT. Abdominal pain in the ED: Stability and change over 20 years. *Am J Emerg Med* 1995; 13:301-303.
4. No. 04-00-00117-cv Court of Appeals of Texas, Fourth District, San Antonio (Lexis 5890 Aug. 29, 2001).
5. Ruotolo RA, Evans SRT. Mesenteric Ischemia in the Elderly. *Clinics in Geriatric Medicine* 1999;15:527-557.
6. McKinsey JF, Gewertz BL. Acute mesenteric ischemia. *Surgical Clinics of North America* 1997; 77:307-318. [Hereinafter Mckinsey].
7. Bassiouny HS. Nonocclusive mesenteric ischemia. *Surgical Clinics of North America* 1997; 77:319-327.
8. McKinsey *supra* note 6, at 310.
9. *Id.* at 311.
10. Smerud MJ, Johnson CD, Stephens DH: Diagnosis of bowel infarction: A comparison of plain films and CT scans in 23 cases. *AJR* 1990;154:99-103.
11. Hortan KM, Fishman EK. Computed tomography evaluation of intestinal ischemia. *Sem Roetgenol* 2001;36:118-125.
12. Klein HM, Lensing R, Klosterhalfen B, et al: Diagnostic imaging of mesenteric infarction. *Radiology* 1995;197:79-82. Taourel PG, Deneuille M, Pradel JA et al. Acute mesenteric ischemia: Diagnosis with contrast enhanced CT. *Radiology* 1996;199:632-636.
13. Ashraf MM. Management of Acute Mesenteric Ischemia. *Arch Surg* 1999;134:328-330.
14. Ruotolo *supra* note 5.
15. Colucciello *supra* note 1, at 7.
16. Slovis CM, Wrenn KD, Meador CK. *A Little Book of Emergency Rules*. Philadelphia: Hanley & Belfus Inc.; 2000.
17. American College of Emergency Physicians: Clinical policy for the initial approach to patients presenting with a chief complaint of nontraumatic acute abdominal pain. *Ann Emerg Med* 1994; 23:206.
18. Sanson TG, O'Keefe KP. Evaluation of abdominal pain in the elderly. *Emerg Med Clin North Am* 1996;14:617.
19. *Id.* at pg. 615.
20. Eisenberg RL, Heineken P, Hedgcock MW, et al. Evaluation of plain abdominal radiographs in the diagnosis of abdominal pain. *Ann of Intern Med* 1982;97:252.
21. Sanson *supra* note 18, at 616.
22. Taourel P, Baron MP, Pradel J, et al. Acute abdomen of unknown origin: Impact of CT on diagnosis and management. *Gastrointest Radiol* 1992;17:287.
23. Court Of Appeals Of Ohio, Third Appellate District, Hardin County 2001 Ohio 2144.
24. *Id.* at 14.
25. *Id.* at 15.
26. Croskerry P. Achieving quality in clinical decision making: Cognitive strategies and detection of bias. *Acad Emerg Med* 2002;9:1184-1204.
27. Frizelle FA, Wolff BG. Colonic volvulus. *Adv Surg* 1996; 29:131-139.
28. Bitterman RA, Peterson MA. Large intestine. In: Marx JA, Hockerberger RS, Walls RM (eds). *Rosen's Emergency Medicine*. 5th ed. St. Louis: Mosby; 2002..
29. *Id.* at page 1334
30. *Id.* at page 1334.
31. Salas S, Angel CA, Salas N, Murillo C, Swischuk L. Sigmoid volvulus in children and adults. *J Am Coll Surg* 2000; 190:717-723.
32. Jones IT, Fazio VW. Colonic volvulus: Etiology and management. *Dig Dis* 1989;7:203.
33. Frizelle *supra* note 27.
34. No. 96-203 Supreme Court of Ohio, 80 Ohio St. 3d. 10 (1997).
35. Rusnak RA, et al. Misdiagnosis of acute appendicitis: common features discovered in cases after litigation. *Am J Emerg Med* 1997;2:397-403.
36. Rogers J. Abdominal pain. *Foresight* Dallas: American College of Emergency Physicians; Dec 1986, Issue 3.
37. Dang C, Aguilera P, Dang A, et al. Acute abdominal pain: Four classifications that can guide assessment and management. *Geriatrics* 2002;57:30-42.
38. Telfer S, Fenyo G, Holt PR, et al. Acute abdominal pain in patients over 50 years of age. *Scand J Gastroenterol Suppl* 1988;144:47-50.
39. Graffeo CS, Counselman FL. Appendicitis. *Emerg Med Clin North Am* 1996;14:661.
40. Kretchmar LH, McDonald DF. The urine sediment in acute appendicitis. *Arch Surg* 1963;87:209.
41. Hoffmann J, Rasmussen O. Aids in the diagnosis of acute appendicitis. *Br J Surg* 1989;76:774.

CE/CME Objectives

[For information on subscribing to the CE/CME program, contact customer service at (800) 688-2421 or e-mail customerservice@ahcpub.com.]

The participants will be able to:

- identify high-risk patients and use tips from the program to minimize the risk of patient injury and medical malpractice exposure;
- identify a “standard of care” for treating particular conditions covered in the newsletter;
- identify cases in which informed consent is required;
- identify cases which include reporting requirements;
- discuss ways in which to minimize risk in the ED setting.

42. Salkin MS. Appendicitis: Avoiding failure to diagnose. *ED Legal Letter* 1996;7:113-124.
43. Thompson MM, Underwood MJ, Dookeran KA, et al. The role of sequential leukocyte counts and creative protein measurements in acute appendicitis. *Br J Surg* 1992;79:822.
44. Hofstrom V. Share et al., A-6902-94t5 Superior Court Of New Jersey, Appellate Division. 295 N.J. Super. 186; 684 A.2d 981; 1996.
45. Bitterman *supra* note 28, at 1330.
46. Floch MH. Update on diverticulitis: diagnostic and therapeutic options. *J Crit Illness* 1993;8:43.
47. Rege RV, Nahrfold DL. Diverticular disease. *Curr Probl Surg* 1989;26:133.
48. Bitterman *supra* note 28, at 1330.
49. Freischla CJ et al. Complications of diverticular disease of the colon in young people. *Dis Rectum* 1986;29:639.
50. Bitterman RA *supra* note 28, at 1330.
51. Id.
52. Id. at 1331.
53. Howes DS, Young WF. Urinary tract infections. In: Tintinalli JE, Kelen GD, Stapczynski JS (eds). *Emergency Medicine. A Comprehensive Study Guide*. 5th ed. New York City: McGraw-Hill; 2000.
54. Rothrock SG, Green SM, Dobson M, et al. Misdiagnosis of appendicitis in nonpregnant women of childbearing age. *J Emerg Med* 1995;13:1-8.
55. Silver BE, Patterson JW, Kulick M, Shadt ME, Heller MB. Effect of CBC results on ED management of women with lower abdominal pain. *Am J Emerg Med* 1995;13:304-306.

CE/CME Questions

1. Which of the following is *not* true regarding adult patients with abdominal pain?
 - A. Diagnostic radiologic imaging is required prior to discharge if the patient’s diagnosis is uncertain.
 - B. Patients with peritoneal signs require either surgical consultation or radiographic imaging.
 - C. Diverticulitis is uncommon in patients younger than 40 years old.
 - D. Routine presentations of gastroenteritis do not require an acute abdomen series.
2. Which of the following is true regarding laboratory evaluation of abdominal pain patients?
 - A. A CBC usually is very helpful in determining the cause of the pain.
 - B. Urinalysis or (urine dipstick) should be performed in all women presenting with abdominal pain.
 - C. A pregnancy test is not indicated unless there is a history of irregular or missed menstrual cycles.
 - D. Urine cultures routinely should be performed in the ED due to poor patient follow-up.
3. Which of the following represents a challenging population to diagnose the cause of abdominal pain?
 - A. The elderly
 - B. The immunocompromised
 - C. The intoxicated
 - D. The pregnant patient
 - E. All of the above
4. Regarding mesenteric ischemia, which of the following is *false*?
 - A. Even despite aggressive diagnosis and treatment strategies, the disease carries a high mortality rate of between 50% and 70%.
 - B. Nonocclusive mesenteric ischemia (NOMI) is responsible for approximately 20%-30% of acute mesenteric ischemic episodes.
 - C. The gold standard for confirming suspicions about mesenteric ischemia is an abdominal CT with IV contrast.
 - D. Negative laboratory studies, plain abdominal films or abdominal CT scans do not “rule out” mesenteric ischemia.

In Future Issues:

Adult Abdominal Pain, Part II