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Abdominal Pain, Part II

Aneurysms and atypical pain can impede correct 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; DIRECTOR OF RESEARCH EMERGENCY MEDICINE RESIDENCY, ATTENDING PHYSICIAN, OSF SAINT FRANCIS HOSPITAL, PEORIA, IL.

Editor's note: This issue of ED Legal Letter is the second of a four-part series related to pitfalls associated with evaluating patients with abdominal pain. The series will analyze high-risk and life-threatening disease processes that ED physicians will encounter in their daily practice. Part one focused on colonic volvulus, mesenteric ischemia, appendicitis, diverticulitis, and pyelonephritis. Part two explores gastrointestinal (GI) bleeding and the necessity of Hemoccult testing; the diagnosis and treatment of aortic aneurysms and abdominal trauma; and extra-abdominal causes of abdominal pain. Later this year, part three of the series will discuss female obstetric and gynecological cases, and part four will highlight medicolegal cases involving abdominal pain in children.

Case No. 1: Peptic Ulcer Disease and Duodenal Perforation

In *Hardy v. Brantley and Hinds General Hospital*,¹ a medical malpractice action was brought against an emergency department (ED) physician and a hospital for negligent failure to diagnose a perforated duodenal ulcer as the cause of the patient's severe abdominal pain. On the morning of Sept. 10, 1980, Brad Ewing, a 35-year-old resident of Jackson, MS, began to experience severe abdominal pain. His brother, Larry Ewing, took him to Hinds General Hospital ED in Jackson. At the time, Mr. Ewing was doubled over from the severe pain in his abdomen. Larry Ewing testified that he and his brother did not seek the

services of any particular physician. Rather, they sought emergency care from whatever health care personnel Hinds General had available, as Mr. Ewing was in great pain. (**Editor's note:** Based on this assertion, the court later found that the hospital may be held vicariously liable for the actions of the ED physician irrespective of a contract with the ED group that contained a disclaimer stating otherwise).

Dr. Terry K. Brantley, an ED physician, treated Mr. Ewing. Dr. Brantley took his blood pressure and ordered various blood tests. The history of the patient as recorded on the hospital record describes that he had been out working in the field in the hot sun prior to his hospital visit. However, Mr. Ewing's brother, Larry, claimed that prior to the visit, he and his brother had been lying on the couch, watching television. Larry Ewing denies ever having told anyone at the hospital that his brother had been in the hot sun. There is some question as to whether Mr. Ewing complained of pain in his extremities, especially his legs, as the

hospital record indicates. Mr. Ewing's blood pressure was slightly elevated, and his white blood count was 14,300, which was above the upper limits of normal (10,000-11,000). Dr. Brantley requested a urinalysis, although it appears that this test never was performed. Dr. Brantley also failed to perform a Hemocult test of Mr. Ewing's stool. No abdominal films were ordered. Dr. Brantley believed that Mr. Ewing was suffering from heat exhaustion. Intravenous (IV) fluids, as well as oral acetaminophen and Valium, were administered. Mr. Ewing remained in the ED for approximately four hours. Prior to Mr. Ewing's release at approximately 6 p.m., Dr. Brantley took his blood pressure again, and again noted the results were somewhat high. However, during his stay in the ED, Mr. Ewing's condition seemed to improve. His abdominal pain became less severe, and he was dismissed with a prescription for Darvon Compound 65 for pain and instructions to drink large quantities of liquids such as Gatorade, orange juice, etc.

The next day, Sept. 11, 1980, Mr. Ewing again began to experience steady and intense abdominal pain. Larry Ewing took his brother back to Hinds General Hospital, and shortly thereafter, Mr. Ewing died. The cause of death noted on the hospital record was cardiorespiratory arrest. An autopsy report was requested by the Hinds County Coroner and was performed by Dr. Rodrigo Galvez. Dr. Galvez concluded that Mr. Ewing suffered from a perforated duodenal ulcer and peritonitis, which was the cause of his death. Dr. Galvez said it was his opinion that Mr. Ewing had been suffering from this condition for approximately 48-72 hours prior to his death. Dr. Galvez also testified that he had performed more than 2000 autopsies and had never performed an autopsy in which someone had died from a perforated duodenal ulcer. It was his opinion that people ordinarily did not die from this condition, since it is easily diagnosed and treatable. (**Editor's note:** The pathologist should not have been permitted to testify on the ease or difficulty of diagnosis of duodenal ulcers. This is not part of a pathologist's training and, therefore, he was not an expert in this area. A pathologist makes diagnoses of the dead, not the living.)

Dr. Ransom, an ED physician from Birmingham, AL, testified that whenever a patient presents with abdominal pain, a physician should obtain a complete history and perform a thorough physical examination. There were some critical elements that he felt had to be included in these procedures that were

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lacking in Mr. Ewing's case. Dr. Ransom contended that the patient history should have included a comprehensive history of the present illness, including statements detailing the pain's location, quality, timing, intensity, and associated factors. Dr. Ransom felt that the patient should have been asked whether he was suffering from additional symptoms, such as fever, nausea, vomiting, diarrhea, or constipation. In addition, a history of past illnesses and surgeries would have been useful, as would some knowledge of medication or drugs that the patient was taking. He observed that in this case, no one even took Mr. Ewing's temperature until after acetaminophen had been administered.

In addition to a complete blood count (CBC), Dr. Ransom opined that several laboratory tests should have been performed, including a urinalysis and amylase levels (a pancreatic and salivary enzyme, measured as a blood level, that often is ordered as a screening test for diseases of the pancreas). He also felt that a bedside stool examination for occult blood would have been important. Finally, he stated that x-ray examination of the flat and upright abdomen should have been obtained. None of these last three diagnostic procedures were performed during the care of Mr. Ewing. It was Dr. Ransom's opinion that when a patient presents to the ED with severe abdominal cramps/pain, there are basically three possibilities that an emergency physician should pursue. These include whether the patient has 1) a perforation (i.e., rupture) of a hollow organ; 2) internal bleeding; or 3) obstruction of some kind (i.e., small bowel obstruction). Dr. Ransom said that the three tests that would have answered these questions were a serum amylase level, a stool examination for occult blood, and plain x-ray films of flat and upright abdomen.

As far as the vital signs that were taken, Dr. Ransom found nothing that would help an emergency physician make the correct diagnosis. However, he opined that if the correct tests had been performed, there was a 100% chance of making a correct diagnosis of a perforated ulcer. Dr. Ransom also said that there was nothing inconsistent with the patient's improvement and the possibility of a perforated ulcer. First, he noted that pain-relieving medications were given (acetaminophen and Valium). Second, he said that it is well recognized, in terms of the sequence of development of symptoms with perforated ulcer, that there is an initial stage in which a patient has a sudden onset of pain, and then there is a reaction stage

during which the abdomen becomes board-like. Between the onset or initial stage and the reactive stage, there often is a lull period in which the patient may seem to improve, even to the point that he or she is convinced that the symptoms are subsiding.

When asked whether the information that was available to Dr. Brantley supported a diagnosis of heat exhaustion, Dr. Ransom replied that heat exhaustion is a diagnosis of exclusion. He further opined that if a person has abdominal pain because of heat cramps, there would be some abdominal rigidity because a cramped muscle is tense, due to spasm. His review of the record convinced him that Mr. Ewing's abdominal musculature was not tense.

The Supreme Court of Mississippi held that: 1) exclusion of testimony of specialists in emergency care was error, to the extent testimony was excluded on grounds that specialist lived and had his professional practice out of state and that he was not familiar with standard of care in city and county where action arose, in general, or in defendant hospital in particular; 2) proffered testimony of specialist in emergency care was sufficient to go to jury; and 3) a hospital operating an ED may be held liable vicariously or under theory of *respondeat superior* for conduct of ED physicians retained by the hospital. The case was reversed and remanded for retrial.

Discussion

In summary, Dr. Ransom was of the opinion that the history of the patient was inadequate, and he was probably correct. Numerous questions appear to have been omitted from the history and physical as well as the past medical history. Abdominal pain is one of the most frequent complaints that ED physicians evaluate and accounts for 4-8% of ED visits among adults.² Despite improving diagnostic technology, 25% of abdominal pain complaints in the ED remain undiagnosed.³ The differential diagnosis of abdominal pain is extremely broad and includes multiple organ systems and, therefore, the ED work-up may be quite labor- and time-intensive. It cannot be overemphasized that often the most important component of the evaluation of abdominal pain is a detailed and accurate patient history. Since the scope of abdominal pain is so large, the history of a patient with abdominal pain must not only include the history of the present illness, but also the patient's prior medical history,

social history, family history, and medication/illicit drug history. Key historical elements of the history of present illness that apply to abdominal pain include the time of onset of the pain and its acuteness; activity of the patient when the pain began; the location and character of the pain; radiation of the pain to other areas; presence of nausea, vomiting, or anorexia; temporal progression of the location and nature of the pain; changes in bowel habits; and menstrual history.⁴

Dr. Ransom's opinion was that the proper tests were not run and that routine tests should be performed on all patients with abdominal pain. Despite his opinion, every patient that presents with abdominal pain does not require x-rays and/or laboratory testing. The purpose of laboratory testing and plain film radiographs is to confirm or exclude diagnostic possibilities that are being considered based upon the proper history and physical exam.⁵ Unfortunately, there is no one, nor an exact series of tests, that uniformly will screen for intra-abdominal catastrophes. Plain film radiographs may be helpful in the diagnosis of the patient with acute abdominal pain. Although plain abdominal radiographs may not be appropriate for every abdominal emergency, they can provide useful information for bowel perforation or obstruction, and are the preferred initial study for these conditions.⁶ The series should include a KUB (kidney, ureters, bladder) view as well as either an upright chest film or lateral decubitus film to assess for the hallmark of a perforated viscous, free intraperitoneal air. For suspected GI obstruction, plain film radiography is diagnostic in 50-60% of cases and normal or misleading in 10-20%.^{7,8} In addition to radiographs, patients may benefit from laboratory testing such as CBC and differential; liver function tests; serum electrolytes; serum creatinine and blood urea nitrogen (BUN); amylase or lipase; and urinalysis.⁹ The accuracy and usefulness of the routine CBC used in isolation is low. An elevated white blood cell (WBC) count does not necessarily imply serious disease, and a normal WBC count may give false comfort.¹⁰ Pregnancy must be ruled out in the female patient of childbearing age with abdominal pain using either a urine or serum beta-human chorionic gonadotropin (beta-hCG). The patient's history of a recent menstrual cycle or tubal ligation should not preclude pregnancy testing.

The timely diagnosis of a hollow viscous perforation is important, as 73% of cases experiencing a delay in diagnosis will develop multiple organ failure and sepsis, with a mortality rate as high as 30%.¹¹ In

the last three decades, there has been a decline in the incidence of perforated peptic ulcer, occurring in approximately seven to 10 patients per 100,000 population annually.¹² Plain abdominal radiographs can be extremely sensitive in diagnosing pneumoperitoneum, detecting even 1-2 cc of free intra-abdominal air.^{13,14} In patients suspected of having a perforated viscus where plain films are either nondiagnostic or too difficult to obtain, computed tomography (CT) of the abdomen is more sensitive for the detection of free air.¹⁵ Although nonoperative treatment occasionally has been applied,¹⁶ the cornerstone of treatment is either open or laparoscopic repair of the perforation.

Case No. 2: Abdominal Trauma

In *Bara v. Clarksville Memorial Health System, Inc.*,¹⁷ the Plaintiff, Sofia Bara, was injured in an automobile accident Nov. 30, 1997. Ms. Bara was driving her father's car, accompanied by her brother Michael and others. The road was wet from a recent rainstorm, and Ms. Bara lost control of her car and struck a tree, causing injury to herself and minor injuries to the other occupants of the car. Both Ms. Bara and her brother were wearing their seat belts. Ms. Bara was taken to the ED at Clarksville Memorial Hospital and first treated by Dr. Doty, who observed symptoms of pain in her abdomen and in her left foot. He also noted she had a seat belt mark with bruising in the abdominal area where the seat belt had been strapped around her. Ms. Bara was obese, weighing between 240 and 250 pounds, and Dr. Doty ordered a CT scan of the abdomen to search for internal injuries.

Dr. Doty consulted the on-call surgeon, Dr. David Miller. The CT scan showed fluid around the liver, which Dr. Miller interpreted as fatty tissue after he conferred by telephone with the radiologist, Dr. Doug Hong. Dr. Hong, in his report on the results of the CT scan, referred to the fluid as "ascites." He explained: "when we said ascites, doctors understand usually this means fluid in the abdomen that includes blood or any kind of fluid . . . even urine or true ascitic fluid or even bile all look alike on the CT scan, and so that's what I meant on my report when I said ascites." Neither Dr. Miller nor Dr. Hong observed any direct injury to the liver discernable on the CT scan.

Ms. Bara was admitted to the hospital at 2 a.m. for observation. Dr. Miller saw her again around 2 p.m. the following afternoon, at which time she was drinking and asking for food; however, he did not

perform a physical examination of her abdomen at that time. He spoke with her, and after checking her vital signs and talking with her mother, stated that it would be fine for her to go home. However, Dr. Miller did not discharge her at that time, nor did he provide any discharge instructions. Ms. Bara also had an orthopedic injury that required evaluation by her orthopedic surgeon, Dr. Salyers, prior to discharge. Dr. Salyers diagnosed a mid-foot injury and ordered a CT scan to rule out a more ominous dislocation pattern, together with an ice pack for her left foot and crutches. There was a question at trial as to who actually discharged Ms. Bara.

She was discharged at around 7:20 p.m. on the evening of Nov. 30, 1997, and sent home with no discharge instructions regarding a possible internal injury or the potential for internal bleeding. She continued to feel ill, and on the night of Dec. 1, 1997, was found unconscious. She died before she could be transported to the hospital. At autopsy a small liver laceration and 2000 cc of blood were discovered in Ms. Bara's peritoneal cavity.

Ms. Bara's parents sued Dr. Miller and Clarksville Memorial Hospital for negligent misdiagnosis and incorrect treatment. The jury returned a verdict for the defendants. The Baras appealed the verdict based upon the jury instructions, and the appellate court found the trial court had committed a reversible error. The judgment in favor of Dr. Miller was reversed and remanded for a new trial. The judgment in favor of Clarksville Memorial Hospital was in all respects affirmed.

Discussion

This is a complicated case that highlights the dangers associated with blunt abdominal trauma. Although abdominal injuries are present in only 7-10% of patients admitted to trauma centers, they are difficult to identify by physical examination alone and require a high index of suspicion.¹⁸ Dr. Doty assumed the patient had suffered an intra-abdominal injury from her blunt trauma, due to the findings of abdominal pain and a seat belt mark across the abdomen. The presence of a seat belt sign is ominous; when present, the incidence of hollow viscous injury rises to 10%.¹⁹ Once an intra-abdominal injury is suspected, a further diagnostic study must be employed.

CT scan of the abdomen is a sensitive and specific

test for intra-abdominal injury and represents the optimal investigation for blunt trauma patients who are hemodynamically stable.²⁰ CT is able to identify and grade the majority of traumatic intra-abdominal injuries, as well as assess for retroperitoneal injury and pelvic fractures. During the 1960s and 1970s, diagnostic peritoneal lavage (DPL) was established as the diagnostic modality for blunt abdominal trauma. The procedure had a high sensitivity for intra-abdominal injury and was able to be done at the bedside in the ED or operating room with a low rate of complications.²¹ DPL remains a valuable tool for diagnosing severe intra-abdominal hemorrhage requiring emergent laparotomy in the hemodynamically unstable trauma patient. However, in the past decade, bedside focused abdominal sonography for trauma (the FAST scan) has played an increasing role in screening the trauma patient for intraperitoneal hemorrhage.

The modality uses a focused bedside ultrasound exam to screen for evidence of hemoperitoneum. The procedure is rapid and noninvasive, is inexpensive, performed at the bedside, requires no contrast media, is suitable for the unstable patient, and has no contraindications.²² FAST exam performed by trained physicians has sensitivity of 86-98% for detecting intraperitoneal fluid.²³ While the procedure is excellent for detecting intra-abdominal hemorrhage and useful for screening hemodynamically unstable patients requiring emergent laparotomy, it is not useful for detecting other abdominal injuries.²⁴

Mostly due to the high-quality imaging that currently is available with CT, nonoperative management of properly selected cases of blunt hepatic trauma is more common. Most nonoperative complications, including delayed hemorrhage, infection, and hemobilia, are extremely rare and may be managed without laparotomy.^{25,26} However, this option requires extreme vigilance of the patient's hemodynamic condition by the treating physician. Multiple recheck examinations of the abdomen, as well as the serial measurement of the patient's hemoglobin or hematocrit, is required to assess for any continued or worsening hemorrhage. These principles are applicable not only to the admitting physician or surgeon, but also to ED physicians, who often care for trauma patients for four to six hours while they are evaluated, treated, and admitted. In this case, the treating surgeon misinterpreted the findings of the CT scan as representing something other than hemorrhage, and

failed to conduct repeat abdominal examinations or serial blood counts. In addition, no discharge instructions or counseling were given to this patient about how to follow up if her symptoms worsened. Regrettably, this patient's death may have been avoided with closer monitoring and more timely intervention.

Case No. 3 Intoxication and Abdominal Pain

In *Miller v. Rhode Island Hospital*,²⁷ the Rhode Island Supreme Court held that a patient's intoxication may render him incapable of giving informed consent and, in emergency situations, that consent may be waived. The patient in this case had a blood alcohol level of 0.233% and was involved in a significant auto accident. Due to the nature of the accident and the patient's condition, the attending physician determined a diagnostic peritoneal lavage was indicated. He performed the procedure despite the patient's objections.

Discussion

In general, patients who present to the ED with a significant alteration in mental status are deemed incompetent to make medical decisions. The alcohol-impaired patient who refuses care presents a difficult situation for ED physicians. If it is determined that a patient cannot understand the risks, benefits, and alternatives of a procedure, he or she may not refuse. It is recommended that ED physicians err on the side of caution, and restrain and treat when necessary. Careful documentation on the indications for restraint and forced treatment must be included in the patient's chart. Complete documentation will help defend the unlikely lawsuit that may follow when the patient decides to pursue litigation despite attempts by the ED physician to save his or her life.

Case No. 4 Abdominal Aortic Aneurysm

In *Johnston v. St. Francis Medical Center Inc.*,²⁸ Emmette Johnston, a 79-year-old male, presented to the ED of Union General Hospital in Farmerville, LA, during the early evening of July 30, 1996, with complaints of right lower-quadrant abdominal pain. Dr. Paul Malabanan examined him and diagnosed an "acute abdomen," and suspected the possibility of appendicitis. Mr. Johnston's blood pressure at the time of his discharge from Union General was

121/74. Mr. Johnston was transferred by ambulance to St. Francis Medical Center in Monroe, where he was to be under the care of Dr. John Price, a general surgeon.

Upon Mr. Johnston's arrival at St. Francis, Dr. Eldridge, the on-duty ED physician, examined him in the ED at the request of Dr. Price. The patient history taken by Dr. Eldridge established that Mr. Johnston's symptoms began during that afternoon and that he had experienced some vomiting and diarrhea. Dr. Eldridge's physical examination noted the patient was not in distress, the blood pressure was 92/60, and the patient's abdomen was soft but mildly distended. Mild tenderness was noted in the right lower quadrant and right upper quadrant. The abdomen also was "mildly tympanic to percussion," and there were scattered bowel sounds. The laboratory tests obtained at Union General Hospital were reviewed, and additional studies were performed. An elevated amylase level was noted. After Dr. Eldridge reported his findings to Dr. Price, Mr. Johnston was admitted to the hospital under the care of Dr. Price. The report compiled by Dr. Eldridge does not mention his review of the abdominal x-ray from Union General Hospital. However, Dr. Eldridge's trial testimony establishes that he did review the x-ray, but noted nothing abnormal.

At approximately 7 a.m. the next morning, Dr. Price examined Mr. Johnston. At that time, the physical examination established a blood pressure of 140/70, and Dr. Price noted that Mr. Johnston appeared to be in "mild distress" and to have a "washed-out appearance." Mr. Johnston's abdomen was soft with tenderness in the right lower quadrant and the epigastrium. Active bowel sounds also were noted to be present. Laboratory tests (obtained that morning) appeared normal, except for elevated BUN, creatinine, and amylase levels. Dr. Price's impression was that the symptoms and lab studies presented an "unclear picture." His differential diagnosis included appendicitis, pancreatitis, ischemic bowel, viral or bacterial gastroenteritis, or diverticulitis. He ordered a gallbladder ultrasound, a CT scan of the abdomen, and a stool culture. Following his examination of Mr. Johnston, Dr. Price left St. Francis to perform surgery at another hospital.

During the morning, Mr. Johnston's condition worsened. At 8 a.m., a nurse noted his blood pressure had declined to 106/65. His abdomen was tender, and there were no bowel sounds. His IV had become dislodged, and attempts to restart it throughout the morning were unsuccessful. By 10:30 a.m.,

Mr. Johnston's blood pressure was down to 81/44. Once Dr. Price learned of Mr. Johnston's condition, he ordered him transferred to the ICU. He was transferred to the ICU by 11:15 a.m.

Dr. Ronald Hammett treated Mr. Johnston upon his transfer to ICU. He found Mr. Johnston to be "in severe abdominal pain, hypotensive, and somewhat tachycardiac." Blood pressure was recorded at 90/100. Dr. Hammett reviewed the x-rays taken the night before and noted the possible presence of an abdominal aortic aneurysm (AAA). Dr. Hammett's impression was that Mr. Johnston was experiencing a "dissecting abdominal aortic aneurysm." After Dr. Hammett placed a central IV line at 12:05 p.m., Mr. Johnston coded, and resuscitation efforts began. Resuscitation efforts continued for almost an hour before a pulse was obtained. Dr. Price took him to the operating room to undergo an exploratory abdominal surgery. He was found to have a ruptured AAA. While surgical repair of the ruptured aneurysm was under way, Mr. Johnston died on the operating table.

A medical review panel rendered a decision finding no failure on the part of the defendants to meet the standard of care. Mr. Johnston's wife and three children filed suit against St. Francis, Dr. Price, and Dr. Eldridge. The matter proceeded to a jury trial of the plaintiffs' claims against Dr. Eldridge and Dr. Price. The plaintiffs alleged that these defendants were negligent in their failure to diagnose the AAA. The plaintiff's alleged that the aneurysm was visible on the x-ray taken at Union General and was indicated by his symptoms and laboratory results.

Three expert plaintiff witnesses (including two who had served on the medical review panel) testified to the ambiguity of the patient's plain abdominal x-rays, especially the finding of faint aortic calcifications. Most of the plaintiff's expert witnesses called also highlighted the atypical presentation of Mr. Johnson for a leaking AAA and stated that the defendants did not violate the standard of care with their treatment.

The plaintiffs presented the testimony of Dr. Robert V. West III, a physician and attorney, who qualified as an expert in emergency medicine. He testified that Dr. Eldridge failed to meet the standard of care because he did not exclude the possibility of an aneurysm. Dr. West believed that symptoms of abdominal pain, falling blood pressure, a falling red blood cell count, and the findings on the plain abdominal x-ray were indicative of bleeding from a rupturing abdominal

aneurysm. Dr. West also opined that the same standard of care would apply to Dr. Price, and he faulted Dr. Price for not looking at the x-ray and lab work when he examined Mr. Johnston. Finally, Dr. West testified that the differential diagnosis for a patient with an acute abdomen should include an AAA. He believed that Dr. Price breached the standard of care in failing to include this potentially life-threatening condition in his differential diagnosis.

Dr. Price stated that the standard would not necessarily require him to have reviewed the x-ray taken at Union General. In addition, he testified that he was not aware that such an x-ray was available when he examined Mr. Johnston. Even if he had known of the x-ray and reviewed it, he could not say that he would have changed his course of treatment. At least one expert, Dr. William T. Ferguson, a general surgeon who served as a member of the medical review panel in this matter, was called by the plaintiffs to testify. He agreed that the standard of care would not require a physician to rule out life-threatening conditions that do not appear to be consistent with the patient's symptoms and complaints. In this instance, Dr. Ferguson believed that Mr. Johnston presented with classic symptoms of a gastrointestinal problem.

The jury found in favor of the defendants. The plaintiffs appealed, assigning as error the jury's failure to find that the treatment rendered by Dr. Eldridge and Dr. Price fell below the standard of care, the jury's failure to award damages, and the trial court's failure to grant the a new trial.

Discussion

Only one expert, Dr. West, unequivocally testified that the defendants breached the standard of care. Although the testimony of the other experts included some criticism of the care rendered by the defendants, the preponderance of the evidence was that no breach in the standard of care occurred. Mr. Johnston's initial symptoms and lab studies presented an unclear clinical picture at the time the events leading up to his death. Both Dr. Eldridge and Dr. Price believed that Mr. Johnston was suffering from some sort of GI problem. However, no diagnosis had yet been made or ruled out at the time that Mr. Johnston went into shock. Additional diagnostic studies were under way to pinpoint Mr. Johnston's ailment. The benefit of hindsight allows experts to deduce that the x-ray and laboratory studies indicated Mr. Johnston's symptoms

were caused by a rupturing AAA. Hindsight cannot form the basis for evaluating the conduct and judgment of the treating physicians at the time their professional judgment was exercised. For these reasons, the appellate court affirmed the trial court's findings for the defendants.

AAAs cause more than 10,000 deaths in the United States each year.²⁹ AAAs usually begin asymptotically and gradually expand over a period of decades. Approximately one-third of AAAs eventually will rupture, with an associated mortality rate of 80%.³⁰ The prevalence and frequency of AAAs increases with age, and the condition is 3-8 times more likely in men compared to women.³¹ Age, male gender, smoking, peripheral vascular disease, and hypertension all have been identified as risk factors for developing an AAA.³²

Diagnosis of an AAA may be difficult, as a patient may have atypical symptoms or, even, no signs or symptoms of the condition. Classically, an AAA may present with a characteristic pain pattern just prior to rupture. Typical symptoms include the sudden onset of severe abdominal, flank, or back pain that may be associated with syncope, hypotension, or a pulsatile, tender mass.^{33,34} Misdiagnoses of rupturing AAA as sigmoid diverticulitis, GI hemorrhage, and renal calculi are not uncommon,³⁵ occurring up to one-third of the time in one study.³⁶ The emergency physician should maintain a high suspicion for an AAA, especially in a patient with risk factors. AAAs may have a varied presentation, as demonstrated in this case, and may not present classically as abdominal pain, hypotension, and a pulsatile abdominal mass. Up to 10% of patients with proven AAAs will present with genitourinary complaints (renal colic, hematuria, urinary retention, or testicular pain).³⁷

While the overall positive predictive value for the detection of an aneurysm by physical examination is low (14.7%),³⁸ several imaging modalities are useful in the diagnosis. In this case, the plaintiff's expert witness, Dr. West, testified that the plain abdominal radiographs indicated findings of an AAA. Findings of an AAA may be present on a plain film of the abdomen and include: calcification of the aneurysm (65%), presence of a soft-tissue mass (67%), complete loss of one or both psoas outlines (78%), or complete loss of one or both renal outlines (78%).³⁹ However, these findings also may be subtle and difficult for the ED physician to appreciate without a

high index of suspicion for the condition, and certainly should not be used to "rule in" or "rule out" the diagnosis. The gold standard for the diagnosis of AAA in the hemodynamically stable patient is a CT scan of the abdomen with intravenous contrast. CT not only demonstrates the size and location of the aneurysm, but also may document a hematoma indicative of a rupture.⁴⁰ While rapid CT is the diagnostic procedure of choice for the hemodynamically stable patient suspected of an AAA rupture, it is completely inappropriate for the hemodynamically unstable patient. Recently, the use of bedside ultrasonography for the rapid confirmation of an enlarged aorta in patients suspected of a rupturing AAA has gained popularity. In the hemodynamically unstable patient with a classic presentation for AAA, bedside ultrasonography has a reported positive predictive value of 100% and a negative predictive value of 97%, with the added bonus of being rapid, safe, inexpensive, and available for performing at the bedside.⁴¹ The ED physician who is caring for the patient with a suspected AAA must identify the condition and assess if the patient is a candidate for immediate vascular repair (aneurysms greater than 5-6 cm in diameter or any leaking aneurysm). The patient should be transferred to an operating room immediately or transported to a facility that will be able to perform the repair. The emergency physician also should anticipate the possibility on hemodynamic collapse in these patients, and place multiple large-bore IV lines, then type and cross-match several units of packed red blood cells in preparation for surgery.

Case No. 5 *MacDonald v. United States of America*⁴²

The plaintiff, a 33-year-old smoker, made at least five separate visits to the ED and primary care clinic at Moody AFB Hospital from June 1988 to October 1988. She complained of abdominal pain, vomiting, diarrhea, and hip pain. She had been treated multiple times with cimetidine and liquid antacids and advised to quit smoking. Follow-up examinations had been arranged and an upper GI study indicated she had a hiatal hernia with probable reflux and duodenitis.

At approximately 8 a.m. on Jan. 29, 1989, the plaintiff awoke with severe upper abdominal pain. Thinking that the pain was caused by her hiatal hernia, the plaintiff tried several measures to reduce the pain, but when the pain did not abate, she went to the ED at

Moody AFB Hospital for further treatment. She arrived at the ED room at 11:33 a.m. complaining of a “crunching” pain in her upper abdomen that radiated up her neck and down her arms. Shortly after arriving, the plaintiff was given a “GI cocktail” consisting of 60 mL of Mylanta, 10 mL of Donnatal, and 10 mL of viscous lidocaine. The physician on duty, Dr. Kimball Beck, then decided to have a plain abdominal x-ray series taken. After examining the x-rays, Dr. Beck concluded that the source of plaintiff’s pain was constipation, and gave the plaintiff a laxative and told her she could go home. She refused, and insisted that she was in too much pain to return home. After further examination, Dr. Beck ordered an electrocardiogram (ECG) and cardiac enzymes at 12:55 p.m. The ECG revealed that the plaintiff was suffering an evolving myocardial infarction. At this point, Dr. Beck contacted South Georgia Medical Center (SGMC) to arrange a transfer of plaintiff to that facility. The transfer to SGMC was deemed necessary because SGMC was capable of providing the plaintiff with the thrombolytic therapy necessary to treat plaintiff’s myocardial infarction, and this therapy was not available at Moody AFB Hospital. Dr. Beck then contacted Dr. Raymond Noel, the internist on call at SGMC, and arranged for plaintiff’s transfer to SGMC. She was transferred to SGMC at 1:10 p.m.

Upon arriving at SGMC, however, the plaintiff was not provided with thrombolytic therapy. Despite Dr. Beck’s conclusion that the plaintiff was suffering a myocardial infarction, Dr. Noel initially treated the plaintiff for what he perceived to be a hiatal hernia condition. By the time SGMC determined that plaintiff was, in fact, suffering from a myocardial infarction, the window of opportunity for administering thrombolytic therapy had passed. A subsequent examination revealed that plaintiff had suffered an acute anterior myocardial infarction.

On Jan. 25, 1991, the plaintiff filed an administrative claim for injury with the United States Air Force. She requested \$4 million for damages suffered as a result of defendant’s failure to diagnose her heart condition. Plaintiff’s claim was denied by the Air Force on Sept. 12, 1991. On March 2, 1992, plaintiff filed suit against the United States pursuant to the Federal Tort Claims Act (“FTCA”), 28 U.S.C 1346(b), the plaintiff asserted that the negligence of the United States Air Force proximately caused her to suffer irreparable damage to her heart and to her health.

The plaintiff contended that the medical care

providers at Moody AFB failed to properly diagnose and treat her heart disease. According to the plaintiff’s expert witness, “when a patient complains of persistent pain or discomfort from ‘stomach bloating’ or ‘heart burn,’ it is particularly important that the medical care provider properly determine the source of the pain or discomfort.”⁴³ The court found that the medical care providers at Moody AFB Primary Care Clinic breached the standard of care required of the profession in failing to diagnose and/or treat plaintiff’s heart disease. In the pretrial order, the defendant wrote that “none of the treating physicians at Moody suspected that plaintiff might be a candidate for coronary artery disease.” The court rejected this claim and stated that “it is difficult to believe that the medical care providers at Moody AFB could examine an overweight smoker with a history of high blood pressure, high cholesterol, and recurrent chest pain, and not find that person to be a candidate for coronary artery disease.” The plaintiff attorney further contended that the failure of Moody AFB to provide, or have available, thrombolytic therapy fell below the standard of care required of such facilities. The defense argued that a Level 3 emergency facility such as Moody AFB Primary Care Clinic was not required to provide thrombolytic therapy.

The court found that the standard of care in January 1989 required a facility representing itself as an ED to have available the use of thrombolytic therapy. The failure of Moody AFB to provide such treatment was a breach of the standard of care applicable in 1989. The court noted that this holding was in no way based on any act or omission on the part of Dr. Kimball Beck, the emergency physician on duty on Jan. 29, 1989. Furthermore, the court found that if plaintiff had been diagnosed and treated at Moody AFB for heart disease prior to Jan. 29, 1989, it would be more probable than not that her myocardial infarction would have been prevented. The plaintiff won her case; however, the total amount of damages awarded is not known.

Discussion

This case highlights an atypical presentation of a myocardial infarction in a patient with risk factors for coronary artery disease. In the past this patient had been diagnosed with a hiatal hernia, but on the day of presentation she had epigastric pain that radiated into her chest and down both arms. An important red flag in this patient’s history was that she stated that her pain

was different than during previous visits to the ED and clinic. Physicians need to think outside the box or, as in this case, “outside the abdomen.” Upon hearing of the plaintiff’s previous GI history relating to her hiatal hernia, Dr. Beck initially discounted any additional diagnoses, and chose to empirically treat her symptoms with a “GI cocktail.” Fortunately, when the plaintiff’s pain did not improve, Dr. Beck obtained an ECG and made the diagnosis. It is important to remember that not all causes of abdominal pain occur from sources within the abdomen. It has been estimated that three out of every four patients presenting to the ED with the complaint of abdominal pain have a nonsurgical origin of their pain.⁴⁴

A particularly important extra-abdominal cause of pain is an acute myocardial infarction (AMI). Atypical presentations for AMI are not uncommon, particularly in women and the elderly.⁴⁵ A potentially dangerous practice, particularly in older patients, is using a “GI cocktail” to aid in the differentiation of abdominal and extra-abdominal sources for a patient’s pain. One study has indicated that eight of 11 patients admitted to the hospital for possible myocardial ischemia had partial or complete relief of their symptoms by a GI cocktail, including two patients who underwent urgent percutaneous transluminal coronary angioplasty the day following their admission.⁴⁶

After ruling out peritonitis, bowel or visceral obstruction, or abdominal vascular catastrophe, clinicians should focus on the various and widespread causes of “nonspecific abdominal pain.” This can include both intra-abdominal and extra-abdominal sources for pain. The differential diagnosis for extra-abdominal sources of abdominal pain is very wide and includes: Addisonian crisis, hypercalcemia, intestinal tuberculosis, acute glaucoma, Rocky Mountain spotted fever, parasitic disease, pulmonary disease (e.g., pneumonia, pneumothorax, pleural effusion, and pulmonary emboli), abdominal wall processes (e.g., herpes zoster or rectus sheath hematoma), and acute porphyria attack.^{47,48} Another important cause of abdominal pain is medications, especially in the elderly.

Roughly 20% of admissions for bleeding peptic ulcers are a result of nonsteroidal anti-inflammatory drugs,⁴⁹ and colchicines, digoxin, codeine, erythromycin, and theophylline all can cause nausea and vomiting.⁵⁰ Other medications, such as phenothiazines, antidepressants, oral hypoglycemic agents, and diuretics, can cause abdominal pain through adverse effects upon the liver.⁵¹

ED physicians should diagnose abdominal pain patients only with what fits the history, physical, and ancillary data. Applying wastebasket diagnoses such as gastroenteritis or constipation to patients’ presentations that do not fit these categories leads to premature closure in the evaluation. For those patients in whom a definitive diagnosis cannot be reached in the ED, diagnoses such as “abdominal pain of undetermined etiology,” “nonspecific abdominal pain,” or “undifferentiated abdominal pain” are more appropriate and communicate the need for further work-up to establish a true diagnosis.⁵²

Endnotes

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CE/CME Questions

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9. Which of the following is *false* regarding radiographs and abdominal pain?
 - A. Plain film radiographs can provide useful information for bowel perforation or obstruction, and are the preferred initial study for these conditions.
 - B. The series should include a KUB (kidney, ureters, bladder) view as well as either an upright chest film or lateral decubitus film to assess for a perforated viscus.
 - C. For suspected gastrointestinal obstruction, plain-film radiography is diagnostic in 50-60% of cases and normal or misleading 10-20% of the time.
 - D. Every patient with abdominal pain should receive abdominal x-rays or sonography.

10. Which of the following is *false* regarding peptic ulcer disease?
 - A. The timely diagnosis of a hollow viscus perforation is important, as two-thirds of cases experiencing a delay in diagnosis will develop multiple

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organ failure and sepsis, with a mortality rate as high as 30%.

- B. There has been an increase in the incidence of perforated peptic ulcer, occurring in approximately seven to 10 patients per 100,000 population annually.
- C. Plain abdominal radiographs can be extremely sensitive in diagnosing pneumoperitoneum, detecting even 1-2 cc of free intra-abdominal air.
- D. CT of the abdomen is more sensitive for the detection of free air.
11. Which of the following regarding abdominal aortic aneurysms (AAA) is *false*?
- A. They cause more than 150,000 deaths in the United States each year.
- B. Abdominal aortic aneurysms usually begin asymptotically and gradually expand over a period of decades.
- C. The prevalence and frequency of AAAs increases with age, and the condition is 3-8 times more likely in men compared to women.
- D. Age, male sex, smoking, peripheral vascular disease, and hypertension all have been identified as risk factors for developing an AAA.
- E. Up to 10% of patients with a proven AAA will present with genitourinary complaints (renal colic, hematuria, urinary retention, or testicular pain).

12. Which of the following is *false* regarding extra-abdominal causes of abdominal pain?
- A. It has been estimated that three out of four patients presenting to the ED with the complaint of abdominal pain have a nonsurgical origin of their pain.
- B. A particularly important extra-abdominal cause of pain is an acute myocardial infarction, particularly in women and the elderly.
- C. Use of “GI cocktails” is an important therapeutic and diagnostic test that should be employed to differentiate the cause of the patient’s pain following his admission.
- D. ED physicians should diagnose abdominal pain patients with only what fits the history and physical, while avoiding inconsistent or premature diagnosis.

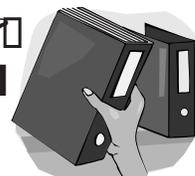
Answers: 9. D; 10. B; 11. A; 12. C.

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