

Managed Care Clinical Corner: Work-up for Diverticulitis

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CASE

A 43-year old female with chronic stomach pain presented to the emergency room with an acute onset of left-sided abdominal pain, nausea and vomiting with loose bowel movements. The patient denied hematemesis, blood per rectum, unusual food intake or flu exposure, or any prior surgical history.

On exam, she appeared ill with a temperature of 38.4°C. She had diffuse left lower-quadrant tenderness without rebound. Bowel sounds were present, but hypoactive.

An obstruction series performed in the emergency department was negative and the only abnormal laboratory test was a white blood count of 14.3 with 23 bands with a left shift.

The patient was admitted to an internal medicine service with a working diagnosis of diverticulitis. Intravenous fluids and antibiotics were started. Colonoscopy confirmed the diagnosis. By the third day of admission the patient's white blood count returned to normal levels, bowel movements were regular, and the patient was placed on a clear liquid diet to be advanced as tolerated. By the fifth day of admission the patient was tolerating solid food but had a new onset of watery diarrhea. A stool sample was sent for *clostridium difficile* (*C difficile*) testing and the patient was placed on intravenous metronidazole hydrochloride for presumed *C difficile*. On the seventh day of admission the patient's stool culture was positive. The patient was taken off of intravenous antibiotics and sent home on a 7-day course of oral metronidazole hydrochloride.

A Word from the Editor

One of the goals of patient management is to assure that the patient receives the right treatment, at the right time, and in the right setting. This case serves as a forum to illustrate and discuss the issues involved in patient management decisions. This particular case involves acute abdominal pain, a condition with a relatively long differential diagnosis. One of the challenges in such a case is to manage the clinical uncertainties and develop an effective management plan.

Robin Smith, MD

The Clinician's Perspective

This 43-year-old woman presents with the acute onset of left lower-quadrant pain, vomiting, and loose bowel movements. We are told she has also had some chronic abdominal pain, but we are not provided with any details. It would be important to take a careful history to determine whether the acute pain resembled the chronic pain. For the purposes of this discussion, I will consider the acute abdominal pain as a new problem. Of note, her temperature is moderately elevated, and she appears ill but not overtly toxic. She is apparently hemodynamically stable. No palpable abdominal mass is described. The preservation of bowel sounds and the lack of rigidity or rebound tenderness go against generalized peritonitis. A pelvic exam is not described. Thinking in the broadest terms, her initial symptoms could be attributed to three organ systems: gastrointestinal, gynecological, and renal. Some of the possible underlying conditions are benign and self-limited; others can be potentially life threatening.

Gastrointestinal illness should be considered first. Acute infectious gastroenteritis is a common cause of vomiting and loose stools. Abdominal pain is also a common feature, although the pain of gastroenteritis is usually intermittent and remarkable for the presence of cramps. Viral agents, such as rotavirus or the Norwalk agent, are common, as are bacterial agents such as *salmonella* and *campylobacter*.

Mechanical bowel obstruction, from adhesions or neoplasm, can produce vomiting and abdominal pain, often accompanied by distention, but this patient is said to have had a negative "obstruction series." Water-soluble contrast would be safe to give in this setting. If high-grade obstruction is suspected, regular barium should not be used.

Left lower-quadrant pain, especially in an older patient with fever and leukocytosis, could be caused by acute diverticulitis. Although this patient is relatively young, diverticulitis is a possibility. Since diverticulitis was the working diagnosis, I will discuss it last. Other possibilities include acute appendicitis with a retrocecal appendix, which can present with poorly localized abdominal pain. Inflammatory bowel disease—Crohn's or ulcerative colitis—usually has a more indolent course, but they can present acutely.

This woman is only 43 years of age and still in her reproductive years; therefore she may be presenting with signs of a gynecologic disorder. An ectopic pregnancy can present with fever, nausea, and left lower-quadrant pain. Pelvic inflammatory disease and tuboovarian abscess are also possibilities. An ovarian cyst, torsion of the ovary, or endometriosis might also be considered. I would definitely take a gynecological history and perform a pelvic examination. I would also want to ensure that the patient is not pregnant. If there were adnexal or cervical motion tenderness, I would have ordered a pelvic ultrasound.

Disorders of the kidney and urinary tract should also be considered. A left-sided ureteral stone can certainly present with excruciating left-sided abdominal pain and tenderness, with nausea, vomiting, leukocytosis and low-grade fever. If a stone is present, urinalysis would likely show hematuria and pyuria. Pyelonephritis, with or without underlying obstruction, can also present with these symptoms. I would definitely want to see a urinalysis and gram stain to rule out this diagnosis.

Finally, let us consider the clinician's working diagnosis: diverticulitis. Acute diverticulitis classically presents with a triad of left lower-quadrant pain (often with a palpable mass), fever, and leukocytosis with left shift. The pathophysiology involves pre-existing diver-

ticulosis in which there develops irritation at the apex of a diverticulum, usually caused by inspissated fecal material. Microperforation of the diverticulum induces an inflammatory reaction in the pericolic fat and adjacent peritoneum. The inflammatory reaction can be quite exuberant, and a phlegmon can form around the involved colon as the peritoneum tries to "wall off" the process, forming a tender mass that can often be palpated. The sigmoid colon is most commonly involved. A fiberoptic sigmoidoscopic examination may show angulation of the sigmoid colon and preexisting diverticuli, but the mucosa usually appears normal. Rarely is the "offending" diverticulum visualized.

If acute diverticulitis is suspected, a full colonoscopic examination is relatively contraindicated, because the carbon dioxide insufflation and vigorous manipulation of the colon during colonoscopy may cause frank perforation of the involved diverticuli and generalized peritonitis; it is also likely to be very painful. A gentle fiberoptic sigmoidoscopic examination is acceptable and can exclude other conditions such as neoplasm or sigmoid colitis. An enema with water-soluble contrast may be useful, because it might show a localized perforation associated with the "offending" diverticulum. A barium enema is contraindicated. Plain abdominal radiographs may be normal, or they may show signs of ileus or early obstruction, with dilation of proximal loops of bowel and air-fluid levels. It would be important to rule out free air.

A sensitive and specific imaging test for acute diverticulitis is computed tomography (CT) with oral contrast. Intravenous contrast, which is expensive and carries some risk of adverse reactions, is not necessary in this setting. CT should show inflammatory changes (such as stranding of fat) around the involved colon. The wall of the colon might also be thickened. Extraluminal gas or fluid collections would indicate localized perforation and abscess formation.

A colonoscopy was done nonetheless and presumably showed diverticuli. If the pelvic exam, pregnancy test, and urinalysis were all normal, a CT scan would have been very helpful to confirm the diagnosis of diverticulitis. Hospitalization was reasonable because she was vomiting and could not take oral fluids. Intravenous antibiotics would be reasonable if diverticulitis were strongly suspected. I would have picked a broad-spectrum agent covering *enterobacteriaceae*, *enterococci*, and anaerobes, such as ampicillin-sulbactam. If she were to improve clinically and resume oral intake, she could be switched to an oral antibiotic such as amoxicillin-clavulanate.

Based on the data presented, the diagnosis of diverticulitis seems somewhat doubtful. She got better after three days on intravenous antibiotics and bowel rest. However, a viral gastroenteritis might also get better over the same time course, in which case the intravenous antibiotics would have been a waste of resources and exposed the patient to the risk of antibiotic-related complications. It would also have been reasonable to withhold antibiotics for perhaps the first 24 hours, and simply hydrate her to see if she got better.

Indeed, this patient had a complication of antibiotics: *Clostridium difficile colitis*. *C difficile colitis* usually presents with watery diarrhea 1 to 2 weeks after the initiation of antibiotics (intravenous or oral). The pathophysiology involves previous colonization with toxin-producing strains of *C difficile*; antibiotics cause overgrowth by eliminating the usual intestinal flora. Most cases are mild and improve with cessation of the offending antibiotic. But severe cases can cause bloody diarrhea and a necrotizing pancolitis. The diagnosis can be made with a consistent history, the presence of fecal leukocytes, and a positive stool assay for *C difficile* toxin. Modern toxin assays give results the same day and are greater than 95% sensitive and specific. Cultures for *C difficile* are much less sensitive, more expensive, and take up to a week to run. If complications of antibiotic therapy are suspected, the offending antibiotic should be stopped if possible and oral metronidazole can be instituted while the toxin assay is pending. It is unfortunate that this patient got *C difficile*, because the antibiotic might not have been necessary in the first place.

In my opinion, the colonoscopy as initial work-up was inappropriate. A CT scan of the abdomen would have confirmed the diagnosis of diverticulitis noninvasively. A urinalysis, pelvic exam, and pregnancy test should also have been done. If the CT scan had been negative, a reasonable option would have been to hydrate her intravenously and observe her in the hospital, off antibiotics. If she became pain-free and her condition improved at 24 hours, I would challenge her with oral liquids. If she tolerated liquids, she should have been sent home with a diagnosis of probable gastroenteritis and dehydration. An outpatient follow-up appointment in 3-4 days should then follow. However, if she had persistent pain at 24 hours, a pelvic ultrasound test should have been performed and a surgical opinion sought while the patient remained on intravenous fluids without oral intake. I might also consider repeating the abdominal CT, especially if her abdominal exam worsened. If she were to develop high fever, worsening abdominal tenderness or rigidity, tachycardia, and/or a ris-

ing leukocytosis, I would draw blood cultures and initiate broad spectrum intravenous antibiotics to cover enteric pathogens for a suspected intra-abdominal abscess or perforated viscus. In addition, an urgent surgical consult would be in order.

The Managed Care Perspective

The patient in this case presented to the emergency department. There are a number of issues involved with this clinical setting. Many managed care organizations (MCOs) have protocols, rules, and/or coverage limitations concerning emergency department services. Protocols commonly include the use of telephone triage systems, contract with the primary care physician (PCP) before or immediately after the emergency department visit, copayments, and the determination of whether the visit involved a true medical emergency. The definition of a true medical emergency is challenging because of different interpretations and perspectives on what constitutes an emergency. One of the many managed care-related issues currently being debated by state legislators is the definition of an emergency. A number of states have passed or are considering legislation to require coverage for an emergency as defined by a "prudent" layperson. While protocol and administrative issues were not presented as part of this case, they are important considerations in the delivery of care in today's healthcare system, particularly for the patient.

The diagnosis given in the emergency department for this case of acute abdominal pain was diverticulitis. A decision was made to admit the patient to the hospital for treatment. For MCOs, especially, the decision to admit is significant; most such organizations have protocols, rules, and coverage limitations regarding hospital admissions. For the clinician, one of the most important issues involves the definition of a medically necessary and/or appropriate admission. Equally important is the documentation of the relevant clinical information and communication to any third-party payors where appropriate. This definition also presents the challenges of different interpretations and perspectives of the stakeholders involved. A number of factors, both in general and specific to this case, should be considered in evaluating the need for admission:

- diagnosis and severity of illness
- temperature
- white blood cell (WBC) count
- electrolyte disturbances
- gastrointestinal bleeding

- vomiting and/or diarrhea
- dehydration
- hypotension
- severity of pain
- imaging results
- significant concurrent disease.

Each of these criteria contribute to an overall picture of the patient's condition. Mild cases of diverticulitis will likely not require admission, whereas severe cases may. It is important to note that most criteria are relative measures. A temperature of 37.6°C, for example, will likely be viewed differently than one of 40°C. Two episodes of vomiting will have different implications than two days of continuous vomiting. In addition, most of the factors are not absolute by themselves—rather, the specific combination of factors are an important consideration. For example, an isolated WBC count of 15,000/cu.mm may not carry much weight by itself, but becomes much more significant if it is present in the context of significant abdominal pain and a temperature of 39.1°C. These criteria are reflected in the many clinical guidelines that are available to guide and bring some consistency to clinical decision making.

Although the patient in the above case was admitted to the hospital, the clinical findings suggest that a trial of outpatient treatment should be considered. The episode of abdominal pain is not new; it is an exacerbation of a chronic problem for this patient. It would be helpful to know what workup she has had in the past and how she responded to outpatient treatment for similar episodes. The temperature and WBC count are mildly elevated. Despite the presence of vomiting, there are no electrolyte abnormalities or signs of dehydration. Someone with this clinical presentation would be expected to “look ill,” but the clinical picture would change if they appeared toxic. There are no significant clinical, laboratory, or radiology findings. Following emergency department treatment with intravenous fluids and antiemetic, if necessary, an acceptable treatment plan could be oral rehydration and antibiotics with clinical follow-up in 1 or 2 days or sooner if symptoms worsened. An interim follow-up phone call to the patient would help to determine if the patient was improving or needed more acute treatment.

The patient progressively improved during the initial part of the admission; there is no additional support for hospitalization. There were no new clinical issues until the development of diarrhea on day five of admission. A successful trial of outpatient therapy

may possibly have averted the development of *C difficile* infection.

Other aspects of patient management may contribute to the care of this patient. Disease management programs can be of benefit to patients with chronic illnesses. However, an appropriate program would likely not be available in this particular case; diverticulitis/diverticulosis is not typically a focus of disease management programs. However, the patient may become a candidate for case management if the disease becomes complicated or if there are frequent admissions or emergency department visits. Active and appropriate clinical management by the primary care physician, including specialist referrals when appropriate, would also be key in the ongoing management of the patient and her condition.

Afterword

The major goal of medical treatment in any setting is to make the correct diagnosis and to deliver the right care based on a constellation of facts gleaned from a thorough history and physical examination. This transcends the type of insurance coverage. Both clinicians stress thoroughness in clinical evaluation before embarking on treatment. The issues highlighted by this case and its discussants are not managed care issues and do not require clinical pathways or insurance executive interpretation. When antibiotics are administered, there should be clinical justification. When patients are hospitalized, the intensity and severity of their illness should be discoverable and communicated to patients, consulting physicians, and payors.

... FOR FURTHER READING ...

1. Feldman M, Sleisenger MH, Scharschmidt BF, and Klein S, eds. *Sleisenger and Fordtran's Gastrointestinal and Liver Disease: Pathophysiology, Diagnosis, and Management*. Philadelphia: WB Saunders and Co., 1998.
2. Roberts PL and Veidenheimer MC. Current management of diverticulitis. *Adv Surg* 1994;27:189-205.
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4. Kelly CP, Pthoulakis C, Lamont JT. Clostridium difficile colitis. *N Engl J Med* 1994;330:257-262.

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