

# Hematuria and Abdominal Pain in a 60-Year-Old Woman

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## CASE PRESENTATION

### History of Present Illness

A 60-year-old woman presented to the emergency department (ED) complaining of red urine and gradual onset, intermittent abdominal pain over the past 2 years. The patient described her abdominal pain as a sharp, tearing sensation over her lower abdomen and suprapubic region involving both lower quadrants, with the pain on her left side exceeding that of the right. Activity and cough worsened the pain, while lying still often relieved the pain. She denied any nausea, vomiting, diarrhea, vaginal discharge, constipation, or bloody or melanic stools. She also denied dysuria but stated that she has had subjective fevers, urinary frequency and urgency, chills, and blood clots in her urine. The patient underwent bladder suspension surgery 6 months prior to this presentation, which resulted in more frequent episodes of abdominal pain and gross hematuria. The patient had presented multiple times to other EDs because of these symptoms. She either left without being seen or was diagnosed with a urinary tract infection (UTI), for which she was prescribed ciprofloxacin and acetaminophen with codeine (Tylenol #3), and was discharged without further work-up.

### Past Medical History

The patient's past medical history included previously diagnosed osteoporosis, osteoarthritis, and diverticulosis via colonoscopy 20 years ago. Her current medications included 300 mg of acetaminophen with codeine (Tylenol #3) as needed for pain associated with her abdomen, 250 mg twice daily of naproxen for osteoarthritis, 10 mg/d of alendronate sodium for osteoporosis, and 0.625 mg/d of conjugated estrogen. She had no known drug allergies. In addition to the bladder suspension performed 6 months ago, the patient's past surgeries included a cholecystectomy in 1979 and a hysterectomy in 1975.

### Physical Examination

The patient's vital signs were as follows: pulse, 97 bpm;

blood pressure, 144/62 mm Hg; oral temperature, 98.7°F (37.1°C); and respirations, 18 breaths/min. The patient was alert, lying still, and not in acute distress. There were no signs of rash, petechiae, or purpura on her skin. Examination of the patient's head, eyes, ear, nose, throat, and cardiovascular and respiratory systems was normal.

Abdominal examination revealed well-healed scars from the aforementioned surgeries. Both bowel sounds and percussion were normal. There was no guarding or rebound, but the patient had tenderness with palpation in the suprapubic area. The results of a hemoccult test was negative. Genitourinary examination revealed normal genitalia and vagina without discharge or lesions. No masses were palpable on abdominal, rectal, or bimanual examination. Extremity and back examinations were normal, and there was no costovertebral angle tenderness. Neurologic examination revealed no gross deficits.

### Laboratory Values and Imaging Studies

The patient had the following complete blood count with differential: leukocytes,  $11,200 \times 10^3/\mu\text{L}$  (normal,  $4800-10,800 \times 10^3/\mu\text{L}$ ); hemoglobin, 13.1 g/dL (normal, 12–15 g/dL); hematocrit, 38.9% (normal, 35%–45%); and platelet count,  $266 \times 10^3/\mu\text{L}$  (normal,  $150-450 \times 10^3/\mu\text{L}$ ). The differential was 71% segmented neutrophils (normal, 56%), 2% bands (normal, 3%), 20% lymphocytes (normal, 34%), 5% monocytes (normal, 4%), and 2% eosinophils (normal, 2.7%). Levels of electrolytes, serum glucose, and renal function were within normal limits. Urinalysis with microscopy revealed: yellow color, pH of 5.5, specific gravity of 1.025, large blood, trace ketones, negative leukocyte esterase, negative nitrite, 2+ protein, 25 to 30 erythrocytes per high-power field (HPF)

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**Figure 1.** The arrow indicates an inflamed diverticulum irritating the surrounding abdominal structures.

(normal, 0–2), 1 to 3 leukocytes/HPF (normal, 0–5), monomorphic erythrocytes without casts, few bacteria/HPF, and few squamous epithelia/HPF.

Because blood was discovered in the urinalysis, a non-contrast computed tomography (CT) scan of the abdomen and pelvis was ordered to evaluate for the presence of nephrolithiasis (**Figure 1**). The scan showed no evidence of renal stones or hydronephrosis, but it revealed acute sigmoid diverticulitis and diffuse atherosclerotic disease of the abdominal aorta and its branches.

### Clinical Course

Based on the patient's abdominal pain, hematuria, and findings on CT, she was diagnosed with an acute exacerbation of diverticulitis. The patient was started on ciprofloxacin 400 mg intravenously (IV) every 12 hours and metronidazole 500 mg IV every 6 hours and was admitted to the internal medicine service. Urology was consulted to determine if there were any other pathologic lesions within the genitourinary system causing her hematuria. An intravenous pyelogram (IVP) revealed mild blunting of the renal calices on the right, with dilatation of the collecting system and narrowing of the proximal right ureter (**Figure 2**). These findings raised the possibility of ureteric malignancy. Also, there was a deformity of the urinary bladder consistent with prior bladder surgery.

Cystoscopy with bilateral retrograde pyelograms was performed; no evidence of tumors or renal stones in the bladder was seen. A retrograde pyelogram of the right kidney showed the blunting to be caused by crossing blood vessels; retrograde pyelogram of the left kidney was normal. Histology of the right ureter was consistent with atypical cellular changes and atypical urothelial cell fragments with mixed inflammation.

The patient was continued on ciprofloxacin and metronidazole for her diverticulitis, and her symptoms



**Figure 2.** Intravenous pyelogram demonstrating the dilated collecting system of the right kidney with narrowing of the right proximal ureter.

improved over the hospital course. There was no documented fever, hypotension, or tachycardic episode during her hospital stay. Repeat urinalysis on day 4 of her hospitalization revealed trace blood but was negative for leukocyte esterase, nitrite, protein, and ketones. Microscopy of the urine was not performed. The patient was hospitalized for 6 days and discharged with the same antibiotics in oral form for 4 more days. She was to follow up with the internists and urologists as scheduled.

### DISCUSSION

Diverticulitis is defined as the presence of diverticula with inflammation. The prevalence of diverticulitis increases with age, and the prevalence of diverticular disease has been estimated to be as high as 30% in persons over age 50 years, 50% in those over 70 years, and 66% in those over 85 years.<sup>1</sup> Age, however, does not rule out diverticulitis, as this disease is now seen more frequently in younger patients.<sup>2</sup> In older patients, however, only an estimated 20% have complications of diverticular disease, such as abscess, perforation, bleeding, obstruction, fistula formation, and, most commonly, diverticulitis.<sup>1,3</sup> Diverticulitis is the most common reason for admission resulting from diverticular disease.<sup>2</sup> Low-fiber diets are also highly correlated with diverticular disease.<sup>2</sup>

### Presentation

Diverticular disease has multiple clinical presentations. Abdominal pain involving the left lower quadrant is the most common complaint of patients with diverticulitis,

**Table 1.** Comparison of Various Radiologic Studies for Diagnosing Diverticulitis

Study	Sensitivity (%)	Specificity (%)	Comments
Colonoscopy	N/A	N/A	Contraindicated in acute diverticulitis
Abdominal series radiographs with upright chest radiograph	N/A	N/A	Detects pneumoperitoneum in 12% of patients
Colonic enema	82	81	Largely replaced by CT; barium contraindicated in acute diverticulitis
Ultrasound	84–98	80–98	Operator dependent; more evidence needed for its use in diverticulitis
CT scan with oral and IV contrast	69–95	75–100	Imaging test of choice; most frequent signs are bowel wall thickening (96%), fat stranding (95%), free air (16%), abscesses (4%), and phlegmons (4%)
MRI	N/A	N/A	More evidence needed for its use; not currently available in all EDs

Data from Hendrickson and Naparst,<sup>3</sup> Pedrosa and Rofsky,<sup>6</sup> Kircher et al,<sup>7</sup> and Stefansson et al.<sup>8</sup>

CT = computed tomography; ED = emergency department; IV = intravenous; MRI = magnetic resonance imaging; N/A = not applicable.

and in 2 reports up to 6% of elderly patients with the chief complaint of abdominal pain were diagnosed with diverticulitis.<sup>3,4</sup> Patients with symptoms such as nausea, vomiting, diarrhea, and lower abdominal pain (usually involving the left lower quadrant) should have diverticulitis in the differential diagnosis.

**Evaluation**

In evaluating patients with suspected diverticulitis, ancillary studies such as a complete blood count and urinalysis are often useful.<sup>5</sup> An elevated leukocyte count is present 69% to 83% of the time, whereas urinalysis helps identify other causes of abdominal pain such as nephrolithiasis or a UTI.<sup>3</sup> A pregnancy test should be performed when appropriate. Diagnostic imaging studies should be performed to determine the etiology of the abdominal pain and to help rule out other life-threatening pathology. Radiographic studies available to determine the presence of suspected diverticulitis or aid in its diagnosis include colonoscopy, plain abdominal films with upright chest radiograph to visualize free air, a colonic enema, ultrasound, CT scan, and magnetic resonance imaging.<sup>3,6</sup> Colonoscopy is relatively contraindicated in an acute episode of diverticulitis because of the risk of perforation.<sup>3</sup> CT scan is currently the imaging modality of choice for diverticulitis, although a normal scan does not completely exclude the diagnosis.<sup>1</sup> **Table 1** shows the sensitivities and specificities of the main imaging studies used in detection of diverticulitis.

**Management**

Once the diagnosis of diverticulitis is made, the patient should be managed medically and/or surgically. Most patients with an acute exacerbation of diverticulitis initially require medical management (**Table 2**). Some authorities have recommended that patients be man-

**Table 2.** Antibiotic Recommendations in Acute Diverticulitis

Management Location	Antibiotic Therapy
Outpatient*	Ciprofloxacin 500–750 mg orally every 12 h plus metronidazole 500 mg every 6 h; or Trimethoprim-sulfamethoxazole double strength 1 tablet orally every 12 h plus metronidazole 500 mg orally every 6 h; or Amoxicillin/clavulanate 875/125–1000/62.5 mg orally every 12 h or 500/125 mg orally every 8 h
Inpatient*	Ciprofloxacin 400 mg IV every 12 h plus metronidazole 500 mg IV every 6 h; or Levofloxacin 750 mg IV every 24 h plus metronidazole 500 mg IV every 6 h; or Piperacillin/tazobactam 3.375 mg IV every 6 h or 4.5 mg IV every 8 h; or Ampicillin/sulbactam 3 g IV every 6 h; or Ticarcillin/clavulanate 3.1 g IV every 6 h; or Cefoxitin 1–2 g IV every 6 h; or Imipenem/cilastatin 500 mg IV every 6 h; <sup>†</sup> or Meropenem 1 g IV every 8 h <sup>†</sup>

Data from Meza,<sup>9</sup> Gilbert et al,<sup>10</sup> and Lipsett and Carpenter.<sup>11</sup>

IV = intravenous.

\*All inpatient regimens are for 7–10 days.

<sup>†</sup>Generally indicated in intensive care unit patients.

aged with oral antibiotics as outpatients if they have close physician follow-up, can tolerate clear oral liquids, are afebrile, have no peritoneal signs, have a supportive social network, and have few comorbidities.<sup>1</sup> Numerous antibiotic regimens have been recommended for the treatment of diverticulitis. Oral ciprofloxacin plus metronidazole, trimethoprim-sulfamethoxazole plus metronidazole, or amoxicillin/clavulanate are all reasonable outpatient choices.<sup>9</sup> If the patient does not meet outpatient criteria, admission is warranted with IV fluid hydration, bowel rest with nothing by mouth status, and

**Table 3.** Imaging Studies Used to Identify Colovesical Fistulas

Study	Identified Fistula (%)	Vesicle Gas Seen (%)	Diffusion of Contrast Medium (%)	Paravesical Abscess Visualized (%)
CT	60	100	N/A	40
LBE	75	N/A	91	8
Sonography	100	100	25	25
Urography	33	N/A	N/A	N/A
Cystography	0	N/A	N/A	N/A
Radiographs	N/A	40	N/A	N/A

Data from Catalano.<sup>21</sup>

CT = computed tomography; LBE = large bowel enema; N/A = not applicable.

IV antibiotics. Inpatient recommendations vary with the severity of the patient's condition.<sup>9</sup> Generally, patients do well, and with medical management relief is usually seen within 2 to 3 days of treatment.<sup>1</sup>

Meperidine with an antiemetic is often used for pain management because morphine and codeine can increase intraluminal pressure, thus adversely exacerbating symptoms. In addition, morphine may initiate spasms in the colon to a greater extent than meperidine would.<sup>12-14</sup> As a result, meperidine has classically been the drug of choice for pain management in diverticular disease; however, there are few recent studies that significantly demonstrate superior results of meperidine over morphine.

### Complications Associated with Diverticula

The presence of diverticula also can cause complications in other organ systems. There are many well-documented reports of colonic fistulas within the vagina, bladder, and uterus.<sup>15-17</sup> Fistulas often form after the diverticulum has inflamed a surrounding anatomical structure, which eventually leads to perforation. These fistulas most commonly form in the bladder.<sup>17</sup> In one study of 192 patients with colonic diverticulitis, 6% of the study group were diagnosed with a fistula. The authors also reported the percentage of each type of fistula they found: colovesicular (44%), colocutaneous (22%), enterocolic (22%), and colovaginal (11%).<sup>4</sup> Colovesical fistulas are more common in men, presumably due to the absence of a uterus that anatomically divides the sigmoid colon and bladder in women.<sup>12</sup> Interestingly, colouterine fistulas are uncommon, which may be due to the extensive blood supply of the uterus and its ability to fight infections.<sup>18</sup> If the fistula has not fully eroded into the bladder or if an acute episode of diverticulitis is occurring, the patient may experience urinary symptoms such as frequency, urgency, dysuria, and possibly hematuria,<sup>3</sup> as was seen with our case pa-

tient. However, if a colovesical fistula has formed, then the patient may develop more symptoms. In Najjar et al's study<sup>19</sup> of patients with confirmed colovesical fistulas, the patient's presenting symptoms were as follows: pneumaturia (77%); UTI, dysuria, or frequency (45%); fecaluria (36%); hematuria (22%); and orchitis (10%). Because fistulas most commonly involve the colon and bladder, much of the current literature deals with the evaluation of the colovesical type. If there is concern that the patient has developed a fistula, then further testing should be performed unless an initial study has already confirmed its presence.

There has been growing interest in the evaluation of colovesical fistulas as imaging studies continue to improve. Sarr et al<sup>20</sup> reported on the following tests and their diagnostic sensitivities for identifying a fistula in patients with confirmed enterovesical fistula: cystogram (40%), small intestinal series (38%), cystoscopy (6%), and IVP (0%). However, they reported that CT was able to identify thickened areas of the bowel and bladder at the site of the fistula in all of their 24 study patients. They were also able to visualize air in the bladder in 20 of 23 patients without a history of transurethral instrumentation (ie, catheters or cystoscopy). Sarr et al<sup>20</sup> recommends CT scan as the initial study for evaluation of enterovesical fistulas. Catalano<sup>21</sup> concluded in a study of 14 patients with confirmed colovesical fistulas that large bowel enema and especially CT scanning were the best ways to accurately diagnose these pathologic fistulas. He also reported that ultrasound is a valuable alternative and that ultrasound combined with CT enables visualization of surrounding colonic structures. These data are shown in **Table 3**.

Najjar et al<sup>19</sup> also agreed with Sarr et al<sup>20</sup> and Catalano<sup>21</sup> that CT scanning should be the initial test in evaluating for colovesical fistulas. The diagnostic sensitivity in Najjar et al's study<sup>19</sup> of 12 confirmed colovesical fistula patients was as follows: CT (90%), barium enema

(20%), and cystography (11%). They also reported that cystoscopy, IVP, and colonoscopy were nondiagnostic. If a colovesical fistula is found, then Najjar et al<sup>19</sup> recommend surgical management, although medical management may be an option initially for unstable patients.<sup>22</sup>

If the patient develops or presents with signs of peritonitis, perforation, bowel wall gas on CT scan, or closed loop obstruction, then immediate surgical consultation is warranted. Surgical evaluation is also indicated the third time the patient has an episode of uncomplicated diverticulitis, although some authorities have lowered this to the second uncomplicated episode.<sup>1,18</sup> Patients younger than age 40 years or those with an immunocompromised state should receive surgical consultation for their first episode of diverticulitis, as their disease course often is more virulent.<sup>18,23–25</sup>

## CONCLUSION

Diverticulitis is a complicated disease with multiple presentations. Even with a thorough history and physical examination, diverticulitis is not always easily diagnosed. Diverticulitis should be considered in almost all cases of abdominal pain, particularly in older patients. There are many complications of diverticulitis, and these may result in severe abdominal pain, sepsis, and even death. Early diagnosis is key to recovery, and general treatment is bowel rest with antibiotics and possibly a surgical consultation.

It is possible that the case patient was having recurrent episodes of diverticulitis that caused her cystitis with hematuria. The ciprofloxacin she was prescribed at her previous ED visits may have partially treated her diverticulitis until the next exacerbation. Fortunately, the patient did well in her hospital course as her symptoms improved dramatically with medical management. **HP**

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