A 69-year-old male presented to the emergency department with left lower quadrant pain, fever, and dysuria for one day. He complained of pneumaturia, but denied any hematuria or fecaluria. On review of systems the patient complained of recent change in the caliber of his stool as well as noted blood in stool. On physical exam the patient had left lower quadrant tenderness, no palpable masses, and bowel sounds were present.
The patient had a past medical history of hypertension and diverticulosis, and a past surgical history of hernia repair with no complications. CT of the abdomen and pelvis were performed with intravenous contrast and oral contrast to look for any fistula or abscess formation.
Diagnosis: Acute sigmoid diverticulitis complicated by abscess and fistula to the urinary bladder.

Imaging findings: Contrast-enhanced CT of the abdomen and pelvis with coronal and sagittal reconstructions revealed colonic diverticulitis and segmental mural thickening involving the mid-sigmoid colon with associated inflammatory change. A 5.0 cm x 3.5 cm peripherally enhancing fluid collection was noted abutting the affected sigmoid colon, as well as a 4.0 x 3.0 cm fluid collection with air abutting the right wall of the urinary bladder. There was also a small amount of air in the nondependent portion of the urinary bladder with no sign of Foley catheterization. On coronal reconstruction images, there was a fistulous tract between the affected segment of the sigmoid colon and the urinary bladder.

Discussion: Fistula formation occurs as a complication in 2 percent to 4 percent of cases of diverticulitis. The major types of fistulas are colovesicular, colovaginal, colouterine, and coloenteric. As diverticular disease most frequently occurs in the sigmoid colon, fistula formation is most commonly colovesicular. Colovesical fistulas are most commonly seen in elderly patients and more frequently in men, with a ratio of 3:1.

Pathophysiology: Diverticuli are outpouchings of colonic mucosa and submucosa that herniate through the smooth muscular layer, most commonly at the entrance points of the vasa recta. They can occur anywhere along the gastrointestinal tract, but are most commonly seen in the sigmoid colon due to its high intraluminal pressure. When fecaliths obstruct a diverticulum, significant
inflammation can occur. This can lead to vascular compromise of the thin walled sac and invasion by colonic bacteria. This leads to erosion and subsequent perforation of the colonic wall. If the inflamed diverticulum lies in close proximity to another organ, erosion can occur into the adjacent wall and result in fistula formation.

Clinical presentation: Common presentations of colovesicular fistula include complaints of pneumaturia, dysuria, and fecaluria. Patients with a history of recurrent urinary tract infection and left lower quadrant pain should also be evaluated with a high index of suspicion for fistula formation.

Diagnosis: CT of the abdomen and pelvis is the most sensitive test for detecting a fistula and should be used as part of initial evaluation. Diagnosis made from CT scan is done by visualization of thickening adjacent to the bladder, colon diverticula, and presence of any air in the bladder. If these symptoms are present then the CT scan is highly sensitive and specific.

Barium enema and endoscopy are not very specific or sensitive, however are useful in assessing the remainder of the colon for any abnormalities. While MRI can be useful in identifying any deep perineal fistula, it is generally not used in routine work up colovesicular fistula due to the increasing quality of CT imaging. In addition the high cost and limited availability associated with MRI decrease the practicality of its routine use in diagnosis. Cystoscopy could also be utilized and will show bullous edema of the bladder mucosa, however the specificity of this test is controversial.

Recent research: The Poppy Seed Test has been introduced as an accurate, convenient, and inexpensive diagnostic test for evaluation of suspected colovesical fistula. The test involves administration of 1.25 g of poppy seeds with fluid or yogurt to the patient, and collecting urine over the next 48 hours. The presence of an enterovesicular fistula would result in detection of poppy seeds in the urine. According to the study, CT was positive in 14 of 20 patients (70 percent) at a cost of $652.92 per study. The poppy seed test was positive in 20 of 20 patients (100 percent) at a cost of $5.37 per study.

The difference in the proportion of patients who tested positive for a fistula on CT and the poppy seed test was statistically significant (p = 0.03).6 CT colonography is also being investigated as an alternative diagnostic tool, especially in cases of negative barium enema and colonoscopy studies as the spasm of the sigmoid can sometimes yield false negative results. However, no clinical trials have demonstrated clinical benefits over traditional CT at this time.

Treatment: Surgical resection of the fistula and involved colon segment in indicated, along with prophylactic broad spectrum antibiotics.

Conclusion: Acute diverticulitis is one of the common causes of left lower quadrant pain in patients over 40 years old, and fistula formation is a complication in 2 percent to 4 percent of patients. With a higher index of suspicion for fistula formation as a complication, quicker radiological detection on CT could lead to significant reduction in morbidity.

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