Recurrent Urinary Tract Infections in an Adult, Male Patient

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This patient's urinary symptoms resolved with culture-directed antibiotic treatment—only to return, repeatedly. Can you identify the underlying problem?

A 67 year-old man presented to the urology department of a VA medical center with reports of recurrent dysuria, suprapubic pain, and urinary frequency over a two-year period. During each of these previous episodes, the patient presented to his primary care provider, who ordered urine cultures and prescribed treatment based on the culture results. In each case, the culture grew a single organism (including, on different occasions, Klebsiella *organisms, alpha-hemolytic* Streptococcus *organisms, and methicillin-resistant* Staphylococcus aureus*); the infection responded to treatment with appropriate, culture-sensitive, oral antibiotics; and the patients' symptoms resolved. The referral to urology had been prompted by the occurrence of gross hematuria during the patient's most recent urinary tract infection (UTI).*

The patient's medical history was significant for hypertension, gastroesophageal reflux disease, and a cerebral vascular accident without residual deficit. Physical examination, which included inspection of the genitalia and a digital rectal examination, yielded unremarkable results. Results of urine cytol-

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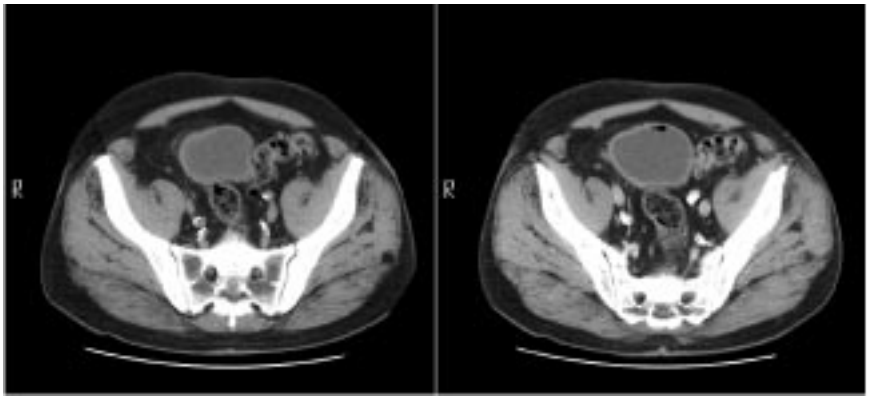

Figure 1. Computed tomography scan of the pelvis, revealing sigmoid diverticula with close adherence to the right posterior and left lateral walls of the bladder (left) and the presence of gas within the bladder (right).

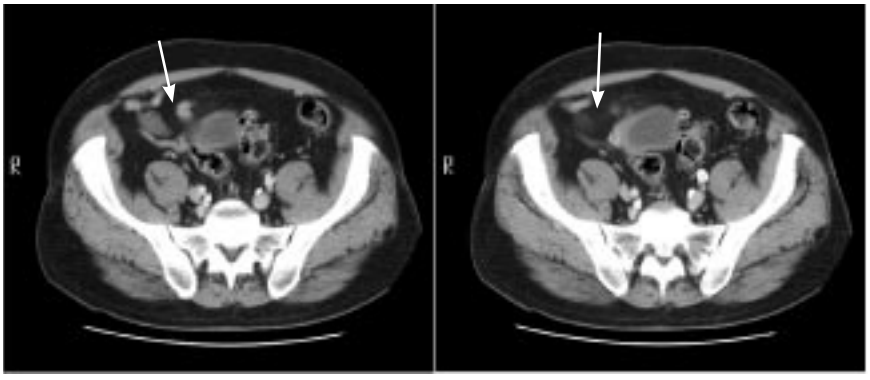

Figure 2. Computed tomography scan of the pelvis, showing a closely adherent appendix (arrows) and right urinary bladder wall. At left, the bladder wall appears normal, but at right, the bladder wall shows thickening.

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ogy and fluorescent in situ hybridization also were normal.

A computed tomography (CT) scan of the abdomen and pelvis with oral contrast revealed sigmoid diverticula (with no evidence of inflammation) that were closely adherent to the right dome (on the posterior side) and the left lateral wall of the urinary bladder, as well as a small volume of air in the bladder (Figure 1). The appendix was seen in close proximity to the urinary bladder, with thickening of the bladder wall, though the radiologist reviewing the scan results did not report this finding as abnormal (Figure 2).

On further questioning, the patient described a single bout of acute diverticulitis a few months prior to the start of his urinary problems, which responded well to antibiotic treatment. He reported no pneumaturia or fecaluria.

A barium enema revealed marked diverticulosis of the sigmoid colon and descending colon with no evidence of communication with the bladder. Cystoscopy demonstrated a 1-cm, edematous area at the dome of the bladder with no other suspicious lesions. Biopsy of this lesion was inflammatory and benign.

What's your diagnosis?

OUR DIAGNOSIS

Surgical exploration of the abdominal cavity revealed significant inflammation and scarring of the appendix, which was densely adherent to the right superior and posterior aspects of the bladder. The distal tip of the appendix was demonstrated in direct continuity with the bladder.

The appendix was removed, the fistulous tract excised, and the bladder closed in two layers. Histology confirmed that the fistulized tip of the appendix was in continuity with the bladder and surrounded by chronic inflammation and granulation tissue. The pathologic diagnosis was chronic appendicitis with appendicovesical fistula.

The patient had an uneventful postoperative course. At one-year follow-up, the patient remained asymptomatic and free of infection.

ABOUT THE CONDITION

When a fistula forms between the bladder and large intestine, it typically involves the sigmoid colon or rectum. Communication between the appendix and bladder is rare, comprising less than 5% of all vesicoenteric fistulae.[1] In the peer-reviewed, medical literature, just over 100 adult cases[2] and 11 pediatric cases[3–5] of appendicovesical fistula have been reported.

Appendicovesical fistulae are more common in men than in women, and the condition is diagnosed most frequently in individuals between the ages of 10 and 40.[6] The lower incidence in women is believed likely to be due to the partial anatomic barrier formed between the bowel and bladder by the uterus.[6] The tendency to affect younger patients may be related to the fact that these fistulae are found most commonly in association with appendicitis, which is more prevalent in younger age groups.

Undiagnosed appendicitis can lead to rupture of the appendix, with subsequent periappendiceal abscess formation and erosion into the bladder. Or, the inflamed serosa of the appendix may simply attach to and penetrate through the bladder wall.[7] The resulting fistula incorporates the lumen of the appendix and may be long and narrow, which allows for periodic complete obstruction by a calculus or fecolith. This results in episodic remission of symptoms, which can, in turn, prolong the time to diagnosis.[2,7,8]

The challenge of diagnosis

The first known case of appendicovesical fistula was reported by W.W. Keen in 1898.[9] His 24-year-old, male patient presented with recurrent urinary tract symptoms and feculent smelling urine. Although a rectovesical fistula was suspected, physical examination and cystoscopy did not identify such a tract. It was only at surgical exploration that an appendicovesical fistula was found. Many subsequent cases, including the one presented here, have mirrored Keen's case in this respect, highlighting the challenge of making a definitive preoperative diagnosis.

In a review of 48 cases of appendicovesical fistula by Haas and colleagues, the duration of symptoms ranged from two weeks to 37 years.[7] Almost half of these patients were under evaluation for two or more years prior to diagnosis. The classic symptoms of colovesical fistulae—pneumaturia and fecaluria—were reported by these authors to occur in 25% and 38% of patients, respectively. The only consistent findings in this review were those of recurrent UTI—including dysuria, urinary frequency, and suprapubic pain—which occurred in 90% of the cases reviewed.

In nine cases published more recently, only one patient had pneumaturia and none had fecaluria.[2,8,10–15] Other symptoms reported in these cases, although infrequently, included groin pain, vague abdominal pain, gross hematuria, urinary retention, and fever. Haas and colleagues' review also showed a low incidence of each of these symptoms, as well as weight loss, nausea, diarrhea, and orchitis.[7]

The case presented herein demonstrated similar findings of relapsing, irritative voiding problems and UTIs but, until the occurrence of gross hematuria during the patient's last episode, none of the less frequent

symptoms. Recurrent UTIs in an adult, male patient are extraordinarily rare in the absence of significant urinary tract abnormalities or recent instrumentation, and they virtually always warrant urologic evaluation. Unfortunately, it was only after the situation progressed to the point of gross hematuria, two years after the patient's symptoms began, that his primary care provider referred him for a urology consultation.

Even when clinical suspicion for colovesical communication is raised in these cases, the standard diagnostic procedures used to identify the source of the fistula (cystography, cystoscopy, barium enema, and CT scanning) are much less helpful when the site of communication is the appendix, compared with other areas of the large intestine. As such, it is important to be aware of certain findings that may suggest—if not conclusively demonstrate—appendicovesical fistula.

Although highly insensitive, cystogram may demonstrate contrast in the fistula tract or cecum or exhibit a filling defect on the right side of the bladder.[8,14] Cystoscopy also has a low sensitivity (approximately 40%) for appendicovesical fistula.[10,13,14] Nevertheless, it may show chronic mucosal inflammation with an erythematous, cobblestone-like pattern at the area of the fistula, usually on the right side of the bladder. An obvious opening, with or without fecal or mucus discharge at this area, may be present. If visualized, the opening should be catheterized and evaluated with a retrograde contrast study.[8]

Barium enema occasionally may demonstrate contrast in the appendix approaching or entering the bladder.[2,8] Ikeda and colleagues described a barium enema study that, in conjunction with a cecal papillary tumor seen on colonoscopy and magnetic resonance imaging, suggested a primary appendiceal neoplasm that had fistulized to the bladder.[15]

CT findings that suggest colovesical fistula include the presence of intravesical gas, intimate association of the bladder and bowel, localized thickening of the bladder wall, and a paravesical mass. The reported sensitivity for CT in diagnosing all colovesical fistulae is 90%[16]—though the sensitivity for appendicovesical fistula, in particular, is much lower. Specific findings on CT that would indicate the origin of the fistula to be the appendix are an abscess or inflammatory mass between the bladder and cecum and thickening or calcification of the right posterior bladder wall.[14]

In the Haas and colleagues' review, correct preoperative diagnosis of appendicovesical fistula was made in 11 (23%) of the 48 cases.[7] All 11 of these cases had a preoperative diagnostic barium enema or suspicious findings on cystoscopy (fistula opening or a mass at the bladder's right dome).

IN SUMMARY

A century after it was first reported, appendicovesical fistula remains a diagnostic challenge. Although the symptoms may suggest a colovesical fistula, they often are intermittent and nonspecific, leading to a delay in diagnosis. Recurrent UTIs in an adult, male patient, as in the case presented here, warrant further evaluation since they suggest a clinically relevant abnormality of the urinary tract. In suspected cases, imaging and endoscopic modalities include CT scan, barium enema, and cystoscopy. Appendectomy, fistula tract excision, and bladder defect repair are the standard operative treatment. ●

Author disclosures

The authors report no actual or potential conflicts of interest with regard to this article.

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REFERENCES

1. Gross M, Peng B. Appendico-vesical fistula. *J Urol.* 1969;102(6):697–698.
2. Steel MC, Jones IT, Webb D. Appendicovesical fistula arising from appendiceal diverticulum suspected on barium enema. *ANZ J Surg.* 2001;71(12):769–770.
3. Cakmak MA, Aaronson IA. Appendicovesical fistula in a girl with cystic fibrosis. *J Pediatr Surg.* 1997;32(12):1793–1794.
4. Izawa JI, Taylor BM, Denstedt JD. Appendicovesical fistula: Case report and review. *Can J Urol.* 1998;5(2):566–568.
5. Steinberg R, Freud E, Dinari G, Schechtman Y, Zer M. Appendicovesical fistula in a child with Crohn's disease: A unique case. *J Pediatr Gastroenterol Nutr.* 1999;29(1):99–100.
6. Carson CC, Malek RS. Appendicovesical fistula. *Minn Med.* 1979;62(11):773–774.
7. Haas GP, Shumaker BP, Haas PA. Appendicovesical fistula. *Urology.* 1984;24(6):604–609.
8. Athanassopoulos A, Speakman MJ. Appendicovesical fistula. *Int Urol Nephrol.* 1995;27(6):705–708.
9. Keen WW. A case of appendicitis in which the appendix became permanently soldered to the bladder, like a third ureter producing a urinary fecal fistula. *Trans Am Surg Assoc.* 1898;16:243.
10. Lund PG, Krogh J. Appendicovesical fistula associated with neuroma of the appendix. *Urol Int.* 1988;43(6):362–363.
11. Bigler ME, Wofford JE, Pratt SM, Stone WJ. Serendipitous diagnosis of appendicovesical fistula by bone scan: A case report. *J Urol.* 1989;142(3):815–816.
12. Timmermans LG, Casselman J. Appendicovesical fistula associated with papillovillous adenoma of the appendix. *Eur Urol.* 1991;20(4):334–335.
13. Jeppesen LJ. Appendicovesical fistula. Case report. *Scand J Urol Nephrol.* 1993;27(1):133–134.
14. Fraley EE, Reinberg Y, Holt T, Sneiders A. Computerized tomography in the diagnosis of appendicovesical fistula. *J Urol.* 1993;149(4):830–832.
15. Ikeda I, Miura T, Kondo I. Case of vesico-appendiceal fistula secondary to mucinous adenocarcinoma of the appendix. *J Urol.* 1995;153(4):1220–1221.
16. Najjar SF, Jamal MK, Savas JF, Miller TA. The spectrum of colovesical fistula and diagnostic paradigm. *Am J Surg.* 2004;188(5):617–621.