Case Report

Sonographic Diagnosis of a Colovesical Fistula Due to Sigmoid Colon Cancer

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Abstract

Based on sonographic findings, colovesical fistula was diagnosed in a 71-year-old man with sigmoid colon cancer. Gray-scale sonography revealed an irregular thickening of the sigmoid colon wall abutting the urinary bladder which also showed thickening in the region of contact. Color Doppler sonography showed a twinkling artifact within the thickened bladder wall. Contrast-enhanced computed tomography scan showed luminal communication between the sigmoid colon and the bladder in the region of thickening.

Keywords: Colon cancer, colovesical fistula, sonography

Introduction

Colovesical fistula indicates an abnormal communication between the colon, usually sigmoid colon, and the urinary bladder.[1] Sigmoid diverticulitis is the most common cause of colovesical fistula,[2] but colon cancer, bladder cancer, radiation, Crohn's disease, and rupture of the appendix are also known to cause this condition.[3,4]

Although sonographic findings of colovesical fistula in sigmoid diverticulitis have been described,[5-7] the sonographic findings of colovesical fistula due to colon cancer have not been described. In addition, the value of color Doppler twinkling artifacts in the diagnosis of colovesical fistula has not been discussed.

Here, we report a case of colovesical fistula due to sigmoid colon cancer that was detected initially as twinkling artifacts on color Doppler sonography.

Case Report

A 71-year-old man was admitted to our hospital reporting 8 kg weight loss with diarrhea for the preceding 15 days. Physical examination including rectal examination was normal. However, laboratory tests revealed leukocytosis (14,000/L) with 88% neutrophils, leukocyturia and elevation of C-reactive protein level (2.94 mg/dL) and carcinoembryonic antigen (6.5 ng/mL).

Gray-scale sonography (iU22; Philips Medical Systems, Bothell, WA, USA) of the abdomen with a 2- to 5-MHz convex array transducer revealed an irregular thickening of the sigmoid colon wall which abutted a thickened region of the urinary bladder wall [Figure 1a]. A hyperechoic spot was seen in the nondependent portion of the urinary bladder. However, no reflection artifact was seen between the thickened walls of the sigmoid colon and urinary bladder. On color Doppler sonography, a twinkling artifact was identified in the thickened bladder wall [Figure 1b]. We tentatively diagnosed sigmoid colon cancer and colovesical fistula related to the sigmoid colon cancer. Contrast-enhanced computed tomography (CT) scan revealed an irregular wall thickening of sigmoid colon, pericolic fat infiltration, and several enlarged pericolic lymph nodes. There was air in the nondependent portion of urinary bladder [Figure 1c]. A coronal and sagittal reformatted image showed luminal communication between the sigmoid colon and the bladder in the region of thickening [Figure 1d].

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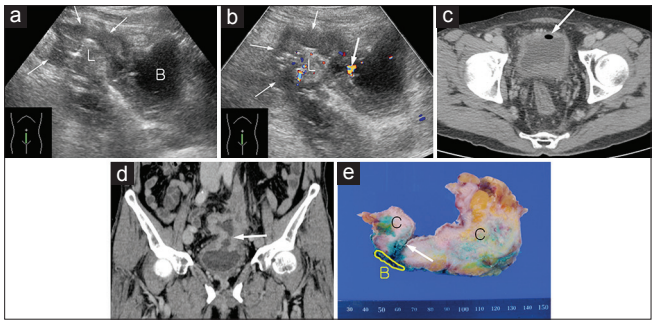

Figure 1: (a) Sagittal gray-scale sonography shows wall thickening of the sigmoid colon (arrows), abutting the urinary bladder wall (b). A linear hyperechoic air bubble is seen in the nondependent portion of urinary bladder. L = Lumen of the sigmoid colon. (b) Color Doppler sonography shows wall thickening of the sigmoid colon (thin arrows) and twinkling artifact within the thickened wall of the urinary bladder (thick arrow). Twinkling artifact is seen in the colonic lumen. L = Lumen of the sigmoid colon. (c) Axial contrast-enhanced computed tomography scan shows an air bubble in the nondependent portion of the urinary bladder (arrow). (d) Coronal computed tomography scan shows wall thickening of the sigmoid colon, whose lumen communicates with that of the urinary bladder (arrow). (e) Cut surface of gross specimen shows ulcerative colon cancer (c) with fistula (arrow) extending into the urinary bladder (b). B = Partially resected urinary bladder

On colonoscopy, an ulcerofungating mass, measuring about 5 cm × 4 cm, was seen in the sigmoid colon; however, the colovesical fistula was not detected.

The biopsy results were interpreted as an adenocarcinoma, and the patient underwent anterior resection and partial cystectomy. At laparotomy, no additional masses were discovered in the abdomen and pelvis. Gross specimen showed direct invasion of ulcerative colon cancer to the urinary bladder up to the lamina propria with fistula formation [Figure 1e]. The final pathologic diagnosis was moderately differentiated adenocarcinoma of the sigmoid colon.

Discussion

Enterovesical fistulas are classified as colovesical, the most common form, rectovesical, ileovesical, and appendicovesical.[5] Diverticulitis is the most common cause of colovesical fistula accounting for 72%–75% of cases.[3,4] Colon cancer is the second-most common cause of colovesical fistula and accounts for approximately 16% of cases.[3,4]

Potential indicators of a colovesical fistula include the presence of fecaluria, pneumaturia, or recurrent urinary tract infections. More than 75% of affected patients describe having one or more of these.[3,4] Confirming the diagnosis of colovesical fistula can be challenging, however, and a patient may be monitored for months before the condition is recognized.

The diagnosis of colovesical fistula may be achieved using sonography, CT, and magnetic resonance imaging (MRI); however, CT is the most sensitive and most commonly recommended for the initial study.[2] The CT findings include gas in the bladder in patients without recent urinary instrumentation, local colonic thickening adjacent to an area of local bladder thickening, and the presence of oral contrast medium in the bladder following nonintravenous contrast-enhanced CT.[3] The presence of contrast medium in the colon following intravenous administration may also be a sign of the colovesical fistula. MRI is useful in this diagnosis because it provides high soft-tissue contrast and multiplanar visualization.[8] Fat suppression using gadolinium-enhanced T1-weighted MRI in the sagittal plane is the best choice in this context.[8]

In sonography, reverberation artifacts caused by air and the presence of echogenic material within the bladder may indicate colovesical fistula,[1] while an echogenic beak connecting the bowel lumen with the bladder and air bubbles or feces squeezing though the fistula tract after compression specifically indicates this condition.[6,7] In a patient with a history of recurrent urinary tract infections, sonography enables early diagnosis of colovesical fistula by detection of multiple reflection artifacts in the urinary bladder; sonography is also noninvasive and is less expensive than other imaging techniques.[1]

Note, however, that reverberation artifacts due to air in the urinary bladder or fistula tract may be difficult to detect if the amount of the air is small. Air bubbles or feces squeezing through the fistula tract after compression may not be detected in a patient who is obese. Garcea *et al*. assert that sonography is generally not helpful in evaluating colovesical fistula.[4]

A twinkling artifact on color Doppler sonography is a rapidly changing aura of red and blue emerging from behind strong reflectors such as calcifications and air bubbles.[9] Analysis of the twinkling artifact may help to characterize its source and identify the underlying condition.[10] The twinkling artifact is thought to be generated in a strongly reflecting medium by a rough interface that splits an incident acoustic wave into multiple reflections with lengthened wavelengths.[9]

In the present analysis, air within the fistula tract gave rise to twinkling artifacts; however, similar phenomenon appears in sonography of urinary and biliary stones, gallbladder adenomyomatosis, and intestinal pneumatosis.[10,11] We diagnosed this colovesical fistula due to sigmoid colon cancer based on the twinkling artifact in the thickened bladder wall on color Doppler sonography. However, we did not detect colovesical fistula on gray-scale sonography.

On sonography, colon cancer presents with significantly greater wall thickness, asymmetric wall involvement, loss of stratification, and short segment involvement.[12,13] Our case was easily diagnosed as a colon cancer on sonography because it presented with greater wall thickness, asymmetric wall involvement, and loss of stratification, without visualization of diverticula.

In conclusion, twinkling artifacts produced by air bubbles within the colovesical fistula tract on color Doppler sonography

may increase the level of confidence in the diagnosis of colovesical fistula.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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