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Computed tomography findings mimicking appendicitis as a manifestation of colorectal cancer★

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Abstract

The primary computed tomography (CT) signs of appendicitis can also be seen with other inflammatory or neoplastic processes. We report on two cases in which appendiceal dilatation and peri-appendiceal fluid or stranding were the dominant imaging manifestations of colorectal carcinoma in the ascending colon. This study highlights the need to closely examine the ascending colon in patients with a suspected CT diagnosis of acute appendicitis, since these findings may be secondary to an inconspicuous colorectal carcinoma.

Keywords

Computed tomography; Colorectal carcinoma; Appendicitis

1. Introduction

Computed tomography (CT) is increasingly used to diagnose acute appendicitis, with reported accuracies of 95–100% [1]. The primary CT signs of appendicitis are appendiceal dilatation and peri-appendiceal fluid or stranding [2], but such findings can also be seen with mucocele of the appendix, peri-appendicitis, and other inflammatory or neoplastic processes involving the appendix. More recently, we encountered two patients in whom appendiceal dilatation and peri-appendiceal fluid or stranding were the dominant imaging manifestations of colorectal carcinoma in the ascending colon. We report these cases to expand the described causes of CT findings that mimic acute appendicitis and to highlight the need to closely examine the ascending colon in patients with a suspected CT diagnosis of acute appendicitis.

2. Materials and methods

This was a retrospective study and was approved by our Committee on Human Research, with waiver of the requirement for informed consent. Between January 2007 and June 2008, contrast-enhanced CT of the abdomen and pelvis was performed at our institution in two

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patients in whom CT changes suggestive of acute appendicitis were secondary to inconspicuous colorectal carcinoma in the ascending colon. Clinical and imaging findings were recorded by review of all available medical and radiological records. Helical CT scans were obtained with a multidetector row CT (LightSpeed, GE Healthcare) at a slice thickness of 1.25 mm, 70–80 s after commencing the administration of 150 ml of intravenous iohexol (Omnipaque 350, GE Healthcare). Images were reconstructed as contiguous 5-mm slices. Intravenous contrast material was injected at 3 ml/s using a power injector (Stellant D; Medrad, Indianola, PA, USA).

3. Results

3.1. Patient 1

A 78-year-old woman presented with a 2-week history of right-sided abdominal pain. CT demonstrated mild appendiceal dilatation and peri-appendiceal fluid, suggestive of acute appendicitis (Fig. 1A). However, the cecum and ascending colon were also moderately dilated and a subtle short segment of concentric wall thickening was seen in the ascending colon, suggestive of primary colonic carcinoma (Fig. 1B). Endoscopic biopsy confirmed the diagnosis of adenocarcinoma. To date, the patient has declined further treatment and has been managed symptomatically. She has not developed other clinical findings of acute appendicitis or its complications.

3.2. Patient 2

A 68-year-old asymptomatic man with a history of renal cell carcinoma underwent routine surveillance CT, which demonstrated a dilated fluid-filled appendix (Fig. 2A). Eccentric wall thickening of the cecum and ascending colon (Fig. 2B) was not initially appreciated, but subsequent colonoscopy 3 months later revealed colorectal carcinoma for which the patient underwent a right hemicolectomy.

4. Discussion

Our study highlights that CT changes suggestive of acute appendicitis may be the dominant imaging manifestation of colorectal carcinoma in the right colon, and careful attention should be paid to the cecum and ascending colon when an interpreting radiologist suspects acute appendicitis. Presumably appendiceal dilatation and peri-appendiceal fluid in the setting of a right-sided colon cancer reflect at least partial or low-grade large bowel obstruction, with back pressure changes in the appendix. While this mechanism is speculative, it would also suggest that obstruction by a colonic mass could progress to full-blown acute appendicitis, and it is of note that the association between right-sided colon cancer and acute appendicitis has been recognized since 1906 [3]. A reported 0.85% (16/1873) of patients with acute appendicitis harbor a colorectal cancer, and routine postoperative optical colonoscopy has been recommended for patients over 40 years with acute appendicitis [4]. In this context, the changes we observed in these two patients could arguably be regarded as “pre-appendicitis”. Irrespective of terminology, it would be a mistake to consider these changes as representing a false-positive diagnosis of appendicitis. That is, appendiceal dilatation and peri-appendiceal fluid secondary to colorectal carcinoma are a true representation of underlying pathology, but the pathology is not a primary inflammatory process in the appendix.

To our knowledge, there has only been one previously reported case of appendiceal dilatation as a manifestation of right-sided colon cancer, and this case was included in a pictorial essay reviewing the clinical and pathologic variants of appendiceal disease at CT [5]. Our report adds to this single case and suggests the phenomenon may be more frequent

than one case report would indicate. More broadly, our series is a reminder that not all appendiceal changes detected at CT are due to acute appendicitis. Other described causes of appendiceal dilatation and peri-appendiceal fluid include a wide variety of inflammatory and neoplastic processes such as Crohn's disease, mucocele of the appendix, peri-appendicitis, adenocarcinoma or other tumors of the appendix, and ischemia [1,5–8]. It should also be remembered that appendiceal diameter is variable, and a diameter over 6 mm has been reported to occur in up to 42% of normal appendixes, either with visible or indiscernible content [9]. It is also possible that a dilated appendix on CT in patients in whom a diagnosis of acute appendicitis is rejected after surgical consultation is still due to acute appendicitis, because up to 38% of these patients ultimately require appendectomy [10]. Noninflammatory thickening of the appendix may also be seen in patients with extra-intestinal cancers [11].

Our report has a number of limitations. This was a single-institution retrospective study. The cases were not identified systematically, and we do not know the frequency of colorectal cancer in patients with appendiceal changes at CT or, conversely, the frequency of appendiceal dilatation or peri-appendiceal fluid in patients with right-sided colon cancer. In the absence of a reasonable large series of histologically proven cases, these values would be difficult to establish. The paucity of prior reports suggests the finding is rare.

In conclusion, CT findings suggestive of acute appendicitis should prompt close inspection of the ascending colon, since these findings may be secondary to an inconspicuous colorectal carcinoma.

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Fig. 1.

(A) Axial contrast-enhanced CT section of the lower abdomen in a 78-year-old woman with right-sided abdominal pain. The appendix (arrow) is fluid filled and distended to a diameter of 10 mm, with surrounding peri-appendiceal fluid. (B) Coronal curved planar reformatted contrast-enhanced CT section shows the terminal ileum (asterisk) is mildly dilated and demonstrates the small bowel feces sign. A subtle short segment of concentric wall thickening (between arrows) is seen in the ascending colon, suggestive of primary colonic carcinoma (subsequently confirmed on endoscopy and biopsy).

Fig. 2. (A) Axial contrast-enhanced CT section of the abdomen in a 68-year-old asymptomatic man with a history of renal cell carcinoma undergoing routine surveillance. CT demonstrates a dilated fluid-filled appendix (arrow) to a diameter of 11 mm. Eccentric wall thickening of the cecum and ascending colon (asterisk) is visible. (B) Coronal curved planar reformatted contrast-enhanced CT section shows the dilated fluid-filled appendix (black arrow) and better demonstrates eccentric wall thickening of the cecum and ascending colon (white arrow).