Adult Onset Appendicitis: Colonscopy Should be Part of the Routine Evaluation in the Early Postoperative Period

Anubha Sinha, Arthur J. DeCross, Michelle Nazareth, Charlotte K. Ryan, Uma Sundaram

We report two cases of small colonic carcinomas that presented clinically as appendicitis and yet were undetected at open or laparoscopic appendectomies. Both tumors were subsequently diagnosed on postoperative colonoscopy. The diagnosis of colonic neoplasm may be missed at the time of appendectomy due to a reluctance to explore the abdomen or due to the limitations of the incision used. Literature review supports that lesions of this small size are not diagnosed perioperatively with either barium enemas or CT scans. We therefore recommend evaluation of the colon with colonoscopy to rule out obstructing neoplasm when older patients present with appendicitis.

CASE REPORT 1

This 63 year old Caucasian man with past medical history significant for hypertension, arthritis, prostate cancer status post radiation therapy, and a family history of colon and pancreatic cancer presented to the emergency department with right lower quadrant pain. The WBC count was 10.1, Hct 41, Plt 213, Amylase 34 and Lipase 83. CT scan of the abdomen revealed a dilated appendix with thickened wall and severe stranding changes consistent with appendicitis. The appendix was grossly inflamed on open appendectomy without evidence of perforation. Histopathology revealed fibrous obliteration of the lumen of the appendix consistent with appendicitis and periappendicitis. His postoperative course was uneventful, and he was discharged 48 hours after surgery.

Three months later, on routine screening colonoscopy he was noted to have a 1.5-cm soft mass arising from and within the appendiceal orifice. The remainder of the colon was only notable for left-sided diverticulosis. The full extent of the mass could not be exposed from the residual lumen of the appendicular stump, and it was judged that a complete and safe endoscopic resection was not feasible. Biopsy of the cecal mass revealed tubular villous adenoma with marked focal dysplasia. (Figure 1A). The preoperative
CEA level was 1.8. The patient underwent laparoscopic ileocectomy. Surgical pathology confirmed a tubulovillous adenoma measuring 2.0 × 1.7 × 1.4 cm with marked dysplasia and a focus of carcinoma in situ that measured 3 × 2 mm (Figure 1B). The margins of resection were free of adenocarcinoma, and regional lymph nodes were negative for metastases. The post-operative course was uneventful, and patient was discharged a week later.

CASE REPORT 2

A 50-year-old Caucasian woman with an unremarkable prior medical history presented to the emergency department with complaints of abrupt onset right lower quadrant pain. She denied nausea, vomiting, and fevers. Abdomen was soft with severe right lower quadrant tenderness without peritoneal signs. WBC 9.5, Hct 38, Plt 279, TB 0.6, AST 22, ALT 30, ALK 81. CT scan of the abdomen suggested acute inflammation of the appendix, with fluid and edema involving the lateral cecum suspicious for ruptured appendix and inflammatory cecitis. She received intravenous antibiotics, and diagnostic laparoscopy and laparoscopic appendectomy done the same evening revealed abnormal adherent fatty tissue overlying the cecum and ascending colon with a non-perforated appendix. The rest of the bowel appeared normal, including terminal ileum. The surgical team commented that they could not determine the acuity of inflammation laparoscopically, and thus the adherent fat was not removed. Surgical pathology revealed fibrous obliteration of the lumen of the appendix with no evidence of acute appendicitis. The post-operative course was uneventful, with an immediate and rapid clinical improvement, and she was discharged a week later. She was lost to surgical follow-up at that point.

Eight months later, she presented to her primary care physician with complaints of right lower quadrant pain, temperature of 101°F and chills, but without nausea, vomiting or diarrhea. The WBC was 9.4, Hct 37, Plt 344, TB 0.7 AST 19, ALT 20 ALK 100 and CEA 0.7. She was started on empiric oral antibiotics without any improvement. She was subsequently admitted to the hospital, and started on IV antibiotics. Physical exam was notable for moderate to severe right lower quadrant tenderness with guarding, but without generalized peri-

Figure 1A. Tubulo villous adenoma with focus of severe dysplasia (glandular architecture is approaching a cribriform pattern).

Figure 1B. Carcinoma in situ depicted by a cribriform pattern.

toneal signs. A repeat CT scan showed increased thickening of the cecum (compared to prior) with haziness in the adjacent abdominal fat. No abscesses or collections were noted. Improvement was monitored in the physical exam of her abdomen, and when relatively softer and less tender (about 5 days), her bowel was prepped and colonoscopy was performed. This revealed a 2-cm friable mass at the appendiceal orifice, extending into the residual lumen of the appendicular stump. As in the first case, this lesion was not felt to be suitable for endoscopic resection. Biopsy revealed a tubulovillous ade-
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Figure 2A. Tubulo villous adenoma characterized by multiple glands with stratified hyperchromatic nuclei.

Figure 2B. Invasive adenocarcinoma. Malignant gland with nuclear pleomorphism infiltrate through a fibrous stroma.

Noma; carcinoma was not present in the initial biopsy (Figure 2A). A right hemicolectomy was subsequently performed, and an extrinsic inflammatory mass at the cecum was noted. The rest of the bowel showed no abnormalities, and the pelvic organs were normal. Surgical pathology examination revealed a 1.2 × 1 × 0.9 cm well to moderately differentiated adenocarcinoma of the colon arising in a preexisting villous adenoma, with transmural invasion through the muscularis propria (Figure 2B). The serosal surface was free of tumor, and there was no evidence of vascular invasion or lymphatic spread, with 15 regional lymph nodes negative for metastases, consistent with TNM stage II (Dukes B2). Her postoperative course was uneventful.

DISCUSSION

Acute appendicitis is a common clinical entity with an approximate incidence of about 90 cases per 100,000 population per year, the highest incidence being found in young adults, peaking between ages 10 and 19 years old (1,3). The lifetime risk of appendicitis is about 7%, but after the age of 50 years, the risk of appendicitis decreases to 1 in 35 for women and 1 in 50 for men (2,3). Obstruction of the appendicular lumen is the most frequent precipitant of appendicitis. In children, this is most often caused by fecaliths and lymphoid hyperplasia. Colonic neoplasms become more frequent in patients over the age of 50, and even distal obstructing neoplasms may be associated with about 3% of cases of appendicitis in this age group (4). In a review of 561 Swedish patients aged 40 years and older operated on because of acute appendicitis, Arnbjörnsson discovered that 2.9% were readmitted within 3 years because of a carcinoma of the colon or rectum. As the incidence of carcinoma of the colon and rectum in the population of Sweden of the same age group was only 0.1% he suggested that the relationship between appendicitis (presenting in older patients) and carcinoma of the colon was significant (6). The association of right-sided colonic neoplasia and appendicitis was first noted by Shears in 1906. Since then the association has been well recognized, although it has been described that in about half of these cases, the involvement between a proximal neoplasia and appendicitis went unrecognized at the time of appendectomy. Costello and Saxton reported a review of 122 cases of cecal cancer, in which 25% of cases presented as appendicitis. In half of these cases, treatment of appendicitis was noted to precede discovery of the cancer (7). Thomas subsequently reported that in a study of 29 patients with cecal carcinoma presenting as appendicitis, 18 out of the 29 cases did not have the cecal carcinoma recognized or diagnosed at the first operation (appendectomy) (8). It is commonly reported that there is an average delay of 4–6 months after appendectomy until diagnosis of colon

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carcinoma, in related case report series (5). Of interest, Peck discussed the poor performance of preoperative diagnostic testing in 32 patients who presented with appendicitis and subsequently found to have colon carcinoma. Ten of the patients had Barium enemas, which were either limited exams due to poor preparation or interpreted as compatible with appendicitis based on cecal wall thickening. (2) CT scans did not alter the preoperative diagnosis of appendicitis and in 4 cases a perforated cecal carcinoma was interpreted as appendiceal abscess (2). Video colonoscopy was not available during the time period of the study.

The mechanism by which colonic carcinoma might precipitate appendicitis is not entirely clear, but it is recognized that obstruction of the actual appendiceal lumen is not required. Distension of the cecum from a distal colonic lesion can be responsible for decreased blood flow resulting in ischemia, necrosis and perforation of the appendix (6, 10). When the association is missed, the carcinoma may present in a variety of ways postoperatively, including weight loss, bleeding, anemia, obstruction, or persistent fecal carcinomatous fistula. (10) The delay in the diagnosis of colonic neoplasia after appendectomy may have far reaching consequences because of the greater chance that regional or distant metastasis may have occurred during this time (9). Survival chances may also be adversely impacted due to the possibility of early dissemination of malignant disease through the breaching of intestinal integrity and tumor cell spillage. In the presence of perforation, or after the bowel wall has been breached, the chance of local recurrence increases to 28%–30% (9).

The diagnosis of a colon tumor at the time of appendectomy may be missed because of reluctance to explore the abdomen in the setting of acute appendicitis or because of limitations of the incision used prohibiting palpation of the colon. Given the weight of the associations described above, it would be recommended to explore the colon to rule out an obstructing neoplasm when the older patient presents with appendicitis. Certainly, when a normal appendix is discovered during an operation in response to the clinical or radiographic suggestion of appendicitis, the need for adequate visualization and palpation of the cecum and remaining colon becomes essential (2). In both of the patients that we presented, the diagnosis of colon carcinoma was not made either at the time of open or laparoscopic appendectomy. Since colon cancer is more frequent after the age of 50, and acute appendicitis is less frequent in people over the age of 50, any patient presenting with signs of acute appendicitis over the age of 50 should be examined carefully to exclude carcinoma of the colon. We feel that our cases illustrate that colonoscopy should be considered the imaging study of choice in these situations, given the small size of the lesions involved. Whereas colonoscopy easily detected these lesions, our experience is that lesions of this size would likely have been missed on a barium enema. The lesions were certainly otherwise asymptomatic, without other clinical or laboratory signs or symptoms to herald their presence, and they were clearly missed during surgery and pre-operative CT scanning. The widespread acceptability, ease and availability of colonoscopy, as emphasized in the last few years for the routine screening of small colon neoplasias, leads us to conclude that colonoscopy should be part of the routine post-operative work up in older patients presenting with appendicitis.

References