

### COLONIC CARCINOMA PRESENTING AS AN APPENDICEAL ABSCESS IN A YOUNG WOMAN

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A 38-year-old woman with stage T4N0M0 adenocarcinoma of the cecum presented with what seemed to be an appendiceal abscess. She had a 10-month history of intermittent abdominal pain in the right lower quadrant. Initial laparotomy revealed an abscess in that quadrant. The abscess was drained. A mass in the cecum, associated with dense fibrous tissue and abscess formation, was found on subsequent surgical exploration. Pathological examination revealed a well-differentiated mucinous adenocarcinoma of the cecum with transmural invasion. The lesion had replaced most of the vermiform appendix and was associated with a periappendiceal abscess. Colonic carcinoma masquerading as acute appendicitis or an appendiceal abscess is a well-recognized entity in the elderly but may be overlooked in younger patients because malignant disease is not suspected.

Une femme de 38 ans victime d'un adénocarcinome du cæcum au stade T4N0M0 se présente avec ce qui semble être un abcès appendiculaire. Depuis 10 mois, elle souffre de douleurs abdominales intermittentes au niveau du quadrant inférieur droit. Une première laparoscopie révèle la présence d'un abcès dans ce quadrant. L'abcès est drainé. Une exploration chirurgicale ultérieure révèle la présence d'une masse dans le cæcum, liée à des tissus fibreux denses et à la formation de l'abcès. Un examen pathologique révèle la présence d'un adénocarcinome mucineux bien différencié du cæcum avec invasion transmurale. La lésion avait remplacé la majeure partie de l'appendice vermiculaire et était liée à un abcès périappendiculaire. Le carcinome du côlon qui se cache sous forme d'appendicite aiguë ou d'abcès appendiculaires est une entité bien reconnue chez les personnes âgées, mais peut être oublié chez les patients plus jeunes parce qu'on ne soupçonne pas la présence d'une tumeur maligne.

The association of acute appendicitis with colonic carcinoma is a recognized entity<sup>1-20</sup> in elderly patients, with over 100 cases reported to date. Approximately 3% of patients over the age of 40 years who present with appendicitis have an underlying colonic carcinoma,<sup>16</sup> but only nine such cases have been reported in patients younger than 40 years.<sup>1,3,4,6,7,12,14,20</sup> Most of the neoplasms are situated in the cecum and ascending colon, but

lesions have been reported more distally in the bowel, including the rectum.<sup>16,19,20</sup> A malignant neoplasm should be suspected in patients who have an atypical history of appendicitis with either prolonged symptoms, a palpable mass, weight loss or anemia.<sup>4,10,13,16,20</sup> Other signs that may indicate an underlying tumour include postoperative fecal fistulas<sup>1,3,7,14,17</sup> and persistent draining wound sinuses.<sup>8</sup> The diagnosis of a malignant tumour

may be missed, even at the time of surgery, because of a limited operative field or difficulty in exploring a markedly inflamed area.

In a younger patient with symptoms of acute appendicitis, the possibility of an underlying colonic carcinoma is less likely to be suspected,<sup>12</sup> and the presence of a tender mass in this setting may be attributed to abscess formation. Even radiologic studies may be misleading.<sup>3,8,20</sup> The follow-

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ing is a case report of a cecal carcinoma that presented as an appendiceal abscess in a young woman. The clinicopathological features and pathogenesis of the association are discussed.

## CASE REPORT

A 38-year-old black woman presented in February 1990 to another hospital with a 2-week history of intermittent pain in the right lower abdominal quadrant. Abdominal ultrasonography performed the week before admission was reported as giving normal results. The patient was febrile and had a leukocytosis. A clinical diagnosis of perforated appendix was made, and a laparotomy was performed. An abscess found in the right lower quadrant was drained. A mass was found in an area where the omentum was adherent to the cecum. The appendix was not visualized, but the gross surgical findings were thought to be consistent with an appendiceal abscess. No further surgery was done.

Six weeks later, a barium enema showed compression of the cecum; the terminal ileum appeared normal. In August 1990, she suffered another episode of right-lower-quadrant pain and was advised to undergo further surgery. She refused and was treated with metronidazole with improvement in her symptoms. During the next 6 months, she had recurrent episodes of similar pain, which were intermittently relieved by a bowel movement. There was no history of melena, bright red blood per rectum, weight loss, nausea or vomiting. A gastroenterologist was consulted in March 1991. Repeat abdominal ultrasonography revealed a 5 × 4 × 4-cm mass with extrinsic compression of the cecum. The radiologic findings and clinical history were considered to be

consistent with an appendiceal abscess, and she was admitted for further investigation and treatment.

On physical examination she was mildly febrile. There was moderate abdominal tenderness in the right lower quadrant but no rebound or guarding. There was no organomegaly or palpable masses. The remainder of the physical examination was unremarkable.

Hematologic investigations revealed mild anemia (hemoglobin level 114 to 126 g/L [normal range 115 to 165 g/L]). The leukocyte count was within normal limits, and the sickle cell screening test gave negative results.

Two days later, the patient underwent colonoscopy. The mucosa was not well visualized at the base of the cecum because of distortion and apparent extrinsic compression. Biopsy of this area revealed tissue consistent with a portion of tubular adenoma. The remainder of the colon appeared normal.

At surgery, a large mass in the right lower quadrant was found adherent to pericolic tissue by dense fibrous tissue. A right hemicolectomy was performed. Intraoperative pathological examination revealed the presence of a cecal tumour. There were no metastatic lesions evident at the time of laparotomy, and the lesion was completely excised.

Postoperatively, the patient received a course of radiotherapy to the operative field followed by chemotherapy with levamisole, 5-fluorouracil and dexamethasone. There was no evidence of recurrent disease 1½ years later.

## PATHOLOGICAL FINDINGS

Gross examination of the right hemicolectomy specimen revealed a tan papillary and polypoid lesion in the cecum, measuring 4 cm in greatest dimension (Fig. 1). There was transmural infiltration of the tumour

into the serosa, where it was associated with dense scarring and a loculated abscess. The orifice and proximal segment of the vermiform appendix were largely obliterated by tumour.

Microscopic examination of the tumour revealed a well-differentiated adenocarcinoma with extensive mucin production (Fig. 2) and a pre-existing tubulovillous adenomatous component. Pools of mucin-containing tumour cells dissected through the muscularis propria into serosal adipose tissue, and abscess formation was confirmed around the site of tumour pen-



**FIG. 1.** Right hemicolectomy specimen. Large papillary, polypoid tumour in cecum obliterates orifice of appendix.



**FIG. 2.** Microscopic view of tumour reveals well-differentiated mucinous adenocarcinoma. (hematoxylin-eosin stain, original magnification ×100).

etration. There was neither metastatic carcinoma in regional lymph nodes nor lymphatic or perineural invasion.

## DISCUSSION

Luminal obstruction by a fecalith or lymphoid hyperplasia is the most common precipitating factor of acute appendicitis in children or young adults.<sup>21</sup> Other lesions associated with appendicitis include adhesions, volvulus and diverticulitis. Primary and, rarely, secondary neoplasms of the appendix<sup>10,14,21,22</sup> or the colon<sup>1-20</sup> may be associated with appendicitis or may, clinically, masquerade as an inflammatory process of the appendix.

The postulated mechanisms<sup>7,11,15</sup> by which colonic tumours may produce acute appendicitis include neoplastic infiltration of the appendiceal wall, intra- or extraluminal obstruction of the appendiceal lumen, obstruction of the vessels or lymphatics, or spread from an adjacent abscess. The pathogenesis of more distal colonic tumours causing appendicitis is more tenuous: some<sup>11-14</sup> have suggested that increased luminal pressure with cecal distension may result in ischemic damage or interfere with normal drainage and thus render the appendix more susceptible to ischemia or inflammation. Obstruction of the base of the appendix is described in some instances.

The pathologic changes of the appendix in association with colonic carcinoma range from acute inflammation<sup>1,4,6,13-18</sup> to gangrene<sup>2,15</sup> and perforation. In some instances,<sup>3,7-9,11,14,15</sup> the appendix may have been destroyed by tumour or abscess formation; in others,<sup>6,9,16</sup> the symptoms mimic appendicitis, but the appendix is not inflamed. Abscess formation<sup>1-3,7-14,20</sup> is less frequently associated with an underlying colonic carcinoma; approximately 26 cases have been reported in all age

groups. The abscess may be appendiceal or paracecal and either secondary to acute appendicitis or a result of transmural penetration by a tumour in the vicinity. The presence of a paracecal abscess due to transmural penetration with perforation of the wall is significant, as it may indicate a stage T4 lesion. Abscess formation may also contribute to a delay in diagnosis if a mass in the right lower quadrant is attributed solely to the inflammatory process.

Ultrasonography has gained an important place in the diagnosis and treatment of appendicitis, particularly if there is an associated mass. It is primarily used to exclude gynecologic causes for the patient's symptoms, but it may also identify a distended appendix, with or without a fecalith, which confirms the clinical diagnosis. If an abscess is noted, it may be drained, guided by either ultrasonography or computed tomography.

Detection of the colonic carcinoma during appendectomy or surgical drainage of an appendiceal abscess may be missed because of inadequate visualization of the colon, a retrocecal appendix in a limited incision or difficulty in exploration because of the inflammatory process. Moreover, differentiating a fibrotic mass from a neoplasm may be impossible without microscopic examination. Features suggestive of a malignant condition include mucoid pus in an abscess (due to mucinous carcinoma)<sup>11,20</sup> or difficulty inverting and tying an appendiceal stump infiltrated by tumour.<sup>20</sup> In these instances, pathological evaluation,<sup>7-9,12,20</sup> preferably by frozen section, of the mass or drained abscess material may reveal an underlying tumour and prevent delay in diagnosis. Follow-up barium enema examination has been recommended in patients over the age of 40 years who undergo appendectomy for symptoms of appendicitis, to rule out a concomitant

carcinoma.<sup>13-16,18,20</sup> The treatment of appendiceal abscess includes surgical or radiologically guided percutaneous drainage<sup>23</sup> and is usually followed by interval appendectomy. In older patients in whom an abscess is drained or in those who have either atypical clinical presentation or a risk factor for colonic carcinoma, cytologic evaluation of the drained material or a biopsy of the mass should be performed. Similarly, an abscess with a solid component or persistent postoperative fecal fistulas warrant assessment.

Acute appendicitis, with or without complications of abscess formation, are common conditions in patients under the age of 40 years. On the other hand, colonic carcinoma is uncommon in this age group but is often associated with either a family history, pre-existing colonic disease or immunosuppression.<sup>24</sup> Although it is a recognized entity in the elderly, colonic carcinoma masquerading as an inflammatory process of the appendix is exceedingly rare in younger patients. Because a diagnosis of malignant disease may not be considered in this age group when there are no risk factors and when acute appendicitis is common, an underlying tumour may remain undetected for long periods. Furthermore, colonic carcinomas that present with symptoms and signs of acute appendicitis or appendiceal abscess in any age group may be advanced tumours with metastases to regional lymph nodes or distal sites<sup>7-9,11,12,14,16</sup> or with penetration of adjacent organs,<sup>17,18</sup> reflecting a delay in the diagnosis of the underlying malignant condition. Recognition of malignant disease in younger patients is important, because carcinomas in this age group are frequently advanced, poorly differentiated or of mucinous type,<sup>24</sup> features predictive of a poor outcome.

## References

1. Mayer FO: Doppelerkrankung bei Appendicitis (sekundäre Appendicitis). *Zbl Chir* 1932; 59: 597-599
2. Parker GE, Rosenthal DB: Carcinoma of the large bowel as the direct cause of acute appendicitis and simultaneous acute intestinal obstruction. *Lancet* 1933; 2: 1089-1090
3. Cook J: Acute appendicitis with carcinoma of the caecum. [letter] *BMJ* 1936; 2: 1083
4. Christopher F: Inflammatory tumors of the cecum simulating acute appendicitis. *Surg Clin North Am* 1936; 16: 215-222
5. Seigers W: Coecumkarzinome unter dem Bilde der Appendicitis. *Zbl Chir* 1938; 14: 744-748
6. Speese J, Bothe FA: Tumors of the cecum simulating acute appendicitis. *Surg Clin North Am* 1938; 8: 917-921
7. McLaughlin EF: Carcinoma of the cecum in association with acute appendicitis. *Am J Surg* 1946; 72: 585-593
8. Burt CA: Carcinoma of the cecum complicated by appendicitis or paracecal abscess. *Surg Gynecol Obstet* 1949; 88: 501-508
9. Hellsten H, Ramstrom S: Coexistent cecal cancer and appendicular abscess. *AMA Arch Surg* 1951; 62: 112-117
10. Costello C, Saxton J: Appendicitis and cancer. *Postgrad Med* 1951; 9: 482-486
11. Muller C, Wooldridge BF: Acute appendicitis with abscess formation as complication of carcinoma of the cecum. *Am J Surg* 1954; 88: 500-503
12. Ruderman RL, Strawbridge HT, Bloom HW: Carcinoma of the cecum, presenting as acute appendicitis: case report and review of the literature. *Can Med Assoc J* 1967; 96: 1327-1329
13. Miln DC, McLaughlin IS: Carcinoma of proximal large bowel associated with acute appendicitis. *Br J Surg* 1969; 56: 143-144
14. Nitschke J, Richter H, Herguth D et al: Acute appendicitis and postoperative fecal fistula: symptoms of an unrecognized carcinoma of the colon. *Dis Colon Rectum* 1976; 19: 605-610
15. Waller DG, Glasgow M: Acute appendicitis in association with non-obstructive carcinoma of the caecum. *Postgrad Med J* 1977; 53: 234-236
16. Arnbjornsson E: Acute appendicitis as a sign of a colorectal carcinoma. *J Surg Oncol* 1982; 20: 17-20
17. Hill J, Leaper DJ: Acute appendicitis and carcinoma of the colon. *J R Soc Med* 1986; 79: 678-680
18. Jones A: A complicated case of appendicitis. *Clin Radiol* 1986; 37: 407-409
19. Sumpio BE, Ballantyne GH, Zdon MJ et al: Perforated appendicitis and obstructing colonic carcinoma in the elderly. *Dis Colon Rectum* 1986; 29: 668-670
20. Peck JL: Management of carcinoma discovered unexpectedly at operation for acute appendicitis. *Am J Surg* 1988; 155: 683-685
21. Collins DC: Etiologic factors in acute appendicitis based upon study of 3,400 cases. *Surgery* 1939; 5: 267-270
22. Cerame MA: A 25-year review of adenocarcinoma of the appendix: a frequently perforating carcinoma. *Dis Colon Rectum* 1988; 31: 145-150
23. Nunez D, Yrizarry JM, Casillas J et al: Percutaneous management of appendiceal abscesses. *Semin Ultrasound CT MR* 1989; 10: 348-351
24. Martin EW Jr, Joyce S, Lucas J et al: Colorectal carcinoma in patients less than 40 years of age: pathology and prognosis. *Dis Colon Rectum* 1981; 24: 25-28

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