Carcinoma of the Cecum, Presenting as Acute Appendicitis:

Case Report and Review of the Literature

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THE association of carcinoma of the cecum and acute appendicitis is probably not as rare as has been reported in the literature. Recently, Hossain[10] found 79 cases and added seven of his own; however, a review of the literature makes it apparent that many of his references quoted the same cases several times. The earliest report of carcinoma of the cecum associated with acute appendicitis was by Shears in 1906.[2] The first significant review was that of McLaughlin[13] in 1946. He found 11 cases, excluding Shears's case, and added one of his own. Burt,[2] in 1949, reported 13 cases, most of which had already been reported by McLaughlin, and added four more. Other single reports and reviews followed,[1, 4-11, 14-16, 18, 20-22] so that to date we have been able to find reports of 71 separate cases. The present case is reported because of problems in diagnosis and management.

H.M., a 30-year-old white male, entered the New Mount Sinai Hospital on March 5, 1965, with a history of crampy, lower abdominal pain that began the previous day and on the evening of admission was most marked in the right lower quadrant. He was anorexic, had no nausea or vomiting, but appeared acutely ill. Temperature was 99.4° F., and pulse rate 96 per min. There were tenderness, spasm and rebound tenderness in the right lower quadrant, all of which were maximum at McBurney's point. The white blood cell count was 15,000 per c.mm.

A diagnosis of acute appendicitis was made and under general anesthesia operation was performed through a McBurney incision. About 200 c.c. of straw-coloured fluid was found in the peritoneal cavity. The appendix was found to be swollen and inflamed throughout its whole length; the cecum was indurated around the base of the appendix. There were multiple white nodules throughout the gastrocolic omentum. A biopsy of one of the white nodules taken from the omentum and examined (by frozen section) revealed metastatic adenocarcinoma. As a result of this finding, a right hemicolectomy was felt to be unjustified. Consequently, the appendix was removed, along with a portion of the adjacent cecum at its base. This contained necrotic-looking tissue that extended into the base of the appendix. From the residual cecum three polyps, seemingly benign, were removed. The cecum was then closed in three layers and a corrugated rubber drain placed through a stab wound down to the site of closure. The abdominal incision was closed without drainage. The final pathological examinations were reported: (1) acute suppurative appendicitis; (2) papillary adenocarcinoma with mucous secretion, arising in the cecum with subserous extension into the proximal half of the appendix and metastatic to the omentum; (3) benign adenomatous polyps of the cecum.

Postoperatively, the patient had an uneventful course. No significant drainage occurred about the rubber drain, which was removed after 10 days. The McBurney incision developed a small wound abscess, from which *E. coli* was cultured. The wound healed after it was opened and drained.

Clinical investigation after the operation revealed: (1) a polyp in the sigmoid colon, as reported from an air-contrast enema, (2) a normal radiographic examination of the stomach and duodenum, (3) a normal liver scintiscan using colloidal radioactive gold (^{198}Au) and (4) normal liver function tests including total proteins, albumin, globulin, prothrombin time, alkaline phosphatase, serum bilirubin, thymol turbidity, cephalin flocculation, bromsulphalein, serum glutamic oxaloacetic transaminase, and serum glutamic pyruvic transaminase.

Because of the hopeless prognosis, palliative chemotherapy was started. He was given a course of intravenous infusions of 1000 mg. 5-fluorouracil in 1000 c.c. 5% dextrose in water daily for 10 days, while in hospital. This was followed by identical weekly intravenous injections. He was discharged in satisfactory condition on March 30, 1965. The patient was still well 11 months later. Weekly injections of 5-fluorouracil were continued.

During the twelfth month of chemotherapy, the patient developed crampy pains and constipation. Repeated examinations revealed enlarging lower abdominal and rectal masses. A barium enema study revealed an obstructing mass extrinsic to the terminal ileum. This was confirmed by radiographic examination of the small bowel. He was readmitted to the New Mount Sinai Hospital and operation was carried out on March 11, 1966. At this time a single large tumour mass extended from the right peritoneal gutter into the pelvis, binding down the cecum and a kinked loop of terminal ileum (accounting for the radiographic findings). Generalized carcinomatosis

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involved the large bowel and serosa of the distal ileum. There were large tumour masses in the gastrocolic omentum, completely covering and concealing the transverse colon. Metastases were not palpated in the liver. A side-to-side ileo-sigmoidostomy was performed to relieve the almost complete obstruction of the terminal ileum. The patient's postoperative course was uneventful and he was discharged on the ninth postoperative day.

After this his condition gradually deteriorated. He complained of more and more pain, anorexia and weight loss. He was admitted to Providence Hospital, Scarborough, for terminal care on June 13, 1966. He died there on August 5, 1966.

DISCUSSION

Carcinoma of the cecum may be associated with acute appendicitis in several ways. Cecal carcinoma may mimic acute appendicitis in its symptomatology and at operation the carcinoma is found, but the appendix is quite normal. Acute appendicitis may be confirmed at operation and the underlying cecal carcinoma detected at the same time. More often, acute appendicitis may be confirmed at operation and the underlying cecal carcinoma may be overlooked or may not be manifest at that time. The carcinoma may only be discovered at a subsequent operation necessitated by a persistent drainage from the appendiceal wound or by the presence of a mass in the area. In only 14 of 40 reported cases were the cecal carcinomas discovered at the primary operation, and in six cases more than two operations were required.[7] Often at operation only an abscess was found and drained, and neither an abnormal appendix nor the cecal carcinoma was evident. It is of interest that Mayo,[12] studying a large series of cases dealing with right colon carcinoma, found that 15% had had a previous appendectomy following the onset of symptoms, which in retrospect were attributable to the malignant lesion. Ransom[17] reported that 11% of patients with cecal carcinomas in his series had had a previous appendectomy.

In reviewing 3400 cases of acute appendicitis, Collins[3] found that obstruction of the lumen caused the appendicitis in 50%. It is in this way that carcinoma of the cecum produces acute appendicitis, i.e. by blocking the lumen or actually extending up into the lumen of the appendix. Hypothetically, it might also act by obstructing the cecum at a more distal site, and by causing a distension of the cecum and appendix, lead to so-called "stercoral" appendicitis.

Patterson[15] found that 25% of 72 cases of cecal carcinoma presented with acute inflammatory features. In Hellsten and Ramstrom's series[8] of 24 cases of cecal carcinoma, seven presented as acute appendicitis. Of these, only four had acute appendicitis, the other three having a normal appendix.

Where acute appendicitis and cecal carcinoma co-exist, the danger is that the carcinoma may be missed. Several circumstances contribute to this.[7] Because of the acute onset of the symptoms, which suggest only acute appendicitis, there may be inadequate preoperative study of the patient. A barium enema may be felt to be unjustified in the face of suspected acute appendicitis. The surgeon often fails to check the cecum carefully at operation. This may be due, in part, to the supposed limitations of a McBurney incision. Complete exploration is usually felt to be contraindicated by an inflammatory process or actual abscess. The surgeon may be unable to distinguish cancerous infiltration from inflammatory induration in the gross specimen.

Since carcinoma of the cecum is rare under the age of 40, and acute appendicitis is less frequent in people over the age of 40, any patient presenting with the signs of acute appendicitis over the age of 40 should be carefully checked for carcinoma of the cecum. If the two conditions cannot be differentiated preoperatively, Feldman feels that there is little or no hazard in performing a diagnostic barium enema.[7] However, the lesion may be small and the cecum is often difficult to examine even under ideal circumstances.

The finding of a right lower quadrant mass should alert the surgeon to the possible presence of a malignancy. In a review of 85 cases with a right lower quadrant mass, Roberts[19] found 17 different causes. However, more than 50% (46 cases) were due to carcinoma. Inflammation frequently cannot be differentiated from cancer by the surgeon. Markgraf[11] recommends biopsy and frozen section diagnosis. This statement we support. It would appear reasonable that any right lower quadrant mass of questionable etiology should be biopsied and examined at the time of operation. If it is carcinoma, a right hemicolectomy should be done if feasible, at that time. In some cases a "by-pass" may be the only possible procedure. If biopsy at the time of operation cannot be done and resection is not done, the patient must be very carefully followed up. In view of the experiences reported, we advise right hemicolectomy in doubtful cases. Conservative treatment and later hemicolectomy is advised only for gravely ill patients. In Hossain's series[10] of seven patients, only the two who had a primary right hemicolectomy survived, whereas those with multiple operations were all dead within a few months. This series,

in addition to Roberts' findings,[19] would support a primary right hemicolectomy for cases of suspected cecal carcinoma associated with acute appendicitis. It is possible that the collection of more data may alter this view.

The presence of an abscess complicates the situation still further.[6] Since it may be due to acute appendicitis or to perforation of the cecal carcinoma, it may not only obscure the diagnosis but may delay resection by adding another stage to the management. It may make the extent of the malignancy more difficult to define, and resection technically more difficult or impossible.

Following appendectomy or drainage of an abscess, any case with a persistent draining sinus, a fecal fistula or a painful right lower quadrant mass should be suspected of being cecal carcinoma.[10] Of 16 patients studied by Thomas,[22] all of whom later proved to have an underlying carcinoma of the cecum, eight had had only drainage of an abscess, four had had an appendectomy, and four had had an appendectomy and drainage of an abscess. Of these 16, 13 developed fecal fistulae postoperatively.

The finding of metastases at primary operation for cecal carcinoma presenting with acute appendicitis has not been previously reported. This would usually contraindicate the performance of a right hemicolectomy, as it did in our case. However, for the relief of obstruction, the surgeon may be compelled to do a resection or a by-pass operation. The use of chemotherapy has not been reported previously in a similar case.

SUMMARY

We have reviewed the literature and found 71 cases of carcinoma of the cecum presenting as acute appendicitis.

To this total we have added one more case, unique in the sense that it was the first to present with metastases at the primary operation and to be treated by appendectomy, local resection of the primary tumour and chemotherapy.

Because in more than half of the reported cases the underlying cecal carcinoma was not evident or was not detected at the primary operation, we have discussed the reasons for this and outlined the subsequent course of such cases.

Although published data are inadequate, primary right hemicolectomy would seem to offer the best prognosis. A plea is made for more careful observation of the cecum at the time of the original operation, whether or not an abscess is present, particularly in people over the age of 40 years.

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