

The Management of Cecal Cancer Discovered Unexpectedly at Operation For Acute Appendicitis.*

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THE DISCOVERY, AT CELIOTOMY, of a totally unexpected problem is always disconcerting, and may at times sorely tax the judgment and ingenuity of the surgeon. This is especially true in emergency procedures, often done at night, on patients in whom the acute nature of the problem may have precluded the usual careful preoperative study. A good example is to be found in those cases in which a cecal cancer has blocked the base of the appendix and caused acute appendicitis. Such cases are by no means rare, though the true situation often remains unrecognized at operation. Surgeons who have had wide experience with the McBurney incision prefer to use it in operations for acute appendicitis, and there is always reluctance to explore widely in the presence of acute inflammation. It is also easy to conclude that the firmness of the adjacent cecum is due to inflammatory reaction alone, and even when one is suspicious of the presence of a cecal neoplasm, the taking of a biopsy offers problems in regard to just where and how to do it. Even when the diagnosis is definitely made at operation, adequate surgical treatment is often postponed, even if perforation has not taken place. The rising generation of surgeons is reluctant to resect a portion of the colon (even the right colon) without a rather elaborate preparatory routine of antibiotics and mechanical cleansing.

On the basis of our own experiences at Roosevelt Hospital and a study of the litera-

ture, we feel that this is a problem of sufficient importance to justify a review of the management of cecal cancer and various inflammatory masses in the right lower abdominal quadrant, discovered at operation for acute appendicitis.

Obstruction of the appendiceal lumen is probably the basis for more than half of all cases of acute appendicitis. Although this is usually due to firm fecaliths, kinking, or "bands", it may be also due to cecal neoplasm and may be the first obvious manifestation of the presence of the neoplasm. About one of eight colonic cancers are in the right colon and about one of 16 in the cecum itself. Hellsten and Ramström⁹ found 28 cases of cecal cancer in a review of 440 cancers of the colon (including rectum). In seven of the 28, the first clinical manifestation was an abscess in the right lower quadrant; in four of these, the abscess seemed to be due to perforation of the appendix. Patterson and Deaver¹⁵ studied 29 cases of cecal cancer, four of which were diagnosed as acute appendicitis. Of these four patients, one had a gangrenous intact appendix, and one, a perforated appendix. In the other two, the inflammatory changes arose from the neoplasm itself. Costello and Saxton⁵ found that in 122 cases of cecal cancer, the original diagnosis was appendicitis in 31; and in 16 of these, treatment of the appendicitis preceded recognition or suspicion of the basic lesion.

Reports such as these point impressively to the fact that surgeons must raise their index of suspicion in order to improve the di-

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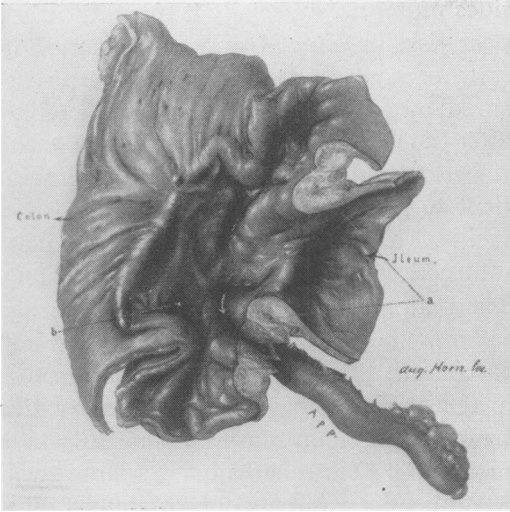


FIG. 1. Drawing of specimen in Kelly's* case (1903) showing blockage of the appendix by cecal cancer.

agnostic record in cancer of the right colon. The large lumen and fluid content contribute to the fact that a cancer of the right colon may be present a long time with little or nothing in the way of symptoms. When the symptoms do appear, the appendix is likely to be considered guilty. In a large series reported in 1947, Mayo¹² found that no less than 15 per cent of patients with right colonic cancer had had their appendices removed after the onset of symptoms relative to their carcinoma.

The anemia so typical of cecal cancer is not always present; however, in retrospect, its presence should have given us an important lead in several of our own cases. Another helpful point in diagnosis is found in the fact that acute appendicitis is not common in elderly people. In our series, many of our patients with malignant obstruction of the appendix base were elderly, and this should have aroused some suspicion, though many cases have been reported in young people.^{4, 7, 11, 24}

The pattern into which these cases fall has been surprisingly constant. An opera-

tion is done for acute appendicitis, with or without abscess. A fecal fistula is likely to appear and this closes in approximately four weeks. Four months after the first operation, the patient returns on account of an abscess, a mass, or both, and is likely to have carcinoma growing along the old drainage tract. Since the original operation was probably done as an "emergency", many of these patients show up in *another* hospital, and these cases are no doubt more common than we have realized. Four of our patients had the first operation done in other hospitals, about 13 weeks earlier on the average.

The diagnosis may be missed even in the second operation, particularly if a recurrent abscess is present. In one of our cases, we missed the diagnosis until the third operation was performed. The unfortunate and common delay in diagnosis, usually four months, is a feature of many reported cases.^{1-3, 11, 14, 16, 18, 22} In our series, we missed the diagnosis at the first operation in four cases, although in one of these, our pathologist came to the rescue by demonstrating a small serosal carcinomatous implant on the surface of the acutely inflamed appendix specimen.

It would seem appropriate to seek helpful suggestions in previous reports on this subject, to apply "hindsight" to our own material, to briefly mention certain closely related conditions, and to try to extract certain conclusions that might help our diagnostic average and improve the early and late results in similar cases in the future.

The earliest pertinent report I have found in the literature is the fourth of five assorted case reports, presented by Dr. A. J. McCosh before the American Surgical Association in 1895.²⁴ The earliest thorough discussion of the whole problem appears, as might have been expected, in Howard Kelly's monumental volume, "The Vermiform Appendix and its Diseases".¹⁰ In his discussion of the various choices open to the surgeon who operates for appendicitis and discovers cecal cancer, he indicated, even at that early

*FIG. 389 in Kelly, H. A. and E. Hurdon, "The Vermiform Appendix". W. B. Saunders & Co., Phila. and London, 1905.

date, that prompt resection seemed the best solution (Fig. 1). The most valuable equipment for diagnosing these cases at operation is a high degree of suspicion beforehand, based on a realization that colonic cancer may not only cause appendicitis, but may masquerade as appendicitis in several ways. A word of caution should be inserted here, that too much enthusiasm may lead to unwise major resections for inflammatory induration alone.

At the time of operation, one may rarely find mucoid material mixed with the pus in an abscess¹³ due to necrosis of a colloid carcinoma. More commonly, suspicion may be aroused by the fact that acute inflammation of the appendix involves the entire organ including the base, rather than the distal portion alone. When it is not feasible to invert the stump, or even to tie it securely, special consideration must be given to the possibility of an underlying cecal cancer. When a foul abscess is present, for which simple drainage is done and there is doubt as to the underlying pathologic lesion, subsequent barium enema study may be misleading. Especially if the ileocecal valve is incompetent, the cecum may be very hard to outline clearly in x-ray studies, and slight changes in outline are easily attributed to the inflammatory process alone. In two of our cases this led to further delay, in one of them in spite of a repeated examination. Other investigators report similar delay in diagnosis due to comforting and misleading roentgenogram reports.^{2, 17}

Helpful hints in the patient's history are likely to be ignored if one concentrates too much on the appendicitis aspect. Christopher's patient⁴ had blood in the stools, and gave a history that his sister had been operated on for cancer of the right colon; yet the possibility that cecal cancer had caused the appendicitis was overlooked before operation, due probably to the fact that the patient was only 28. Even in old patients, one may be inclined to be too conservative in the presence of a tender mass if it sub-

sides promptly, especially if the patient is a poor risk. In Case 11 of our own series, in spite of a marked anemia, we were reassured by a negative barium enema report after the subsidence of a tender mass in the right lower quadrant, and allowed the patient to go home because he was old and feeble. Four months later, the tender mass returned and ileocolic resection was done. The patient died two days later of cardiac failure, and autopsy showed no residual carcinoma. Bank's case¹ was similar, in that a recent hemiplegia led to conservative treatment of mild acute appendicitis in a man of 63. Four months later, a large swollen appendix was found, obstructed by cecal cancer. A good early result followed resection in spite of the delay.

Thomas' summary,¹⁹ covering 29 cases of carcinoma of the cecum, with acute appendicitis as the presenting symptom, would seem to be a fair presentation of the discouraging past history. In only 11 of these 29 patients, was the true nature of their problem discovered at the first operation, in 16 at a subsequent operation, and in two not until autopsy.

Our case reports have been selected from approximately 200 cancers of the right half of the colon treated at Roosevelt Hospital. In 72 cases, the cancer was in the cecum itself. In approximately one-quarter, the acute inflammatory features predominated the clinical picture. Seventeen cases have been selected as pertinent to our subject, with special reference to 13 patients in whom the base of the appendix was blocked by cecal cancer with resulting appendicitis.

One of the tumors was a malignant carcinoma of the cecum, the others of the usual type. In eight of our patients, there was delay in appreciation of the true problem at the first operation, four having been first treated in other hospitals. It is encouraging, however, that in our last three patients, correct diagnosis was made and immediate resection was done (Figs. 2 and 3). We be-

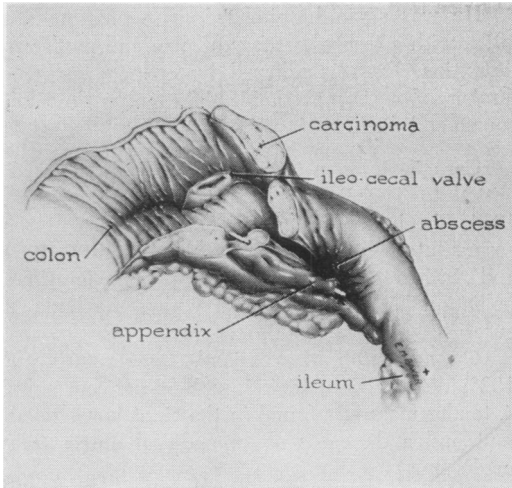


FIG. 2. Drawing of specimen in Case 2. Probe lies in the appendix, which shows blockage of its base by tumor and absence of its tip, with small abscess.

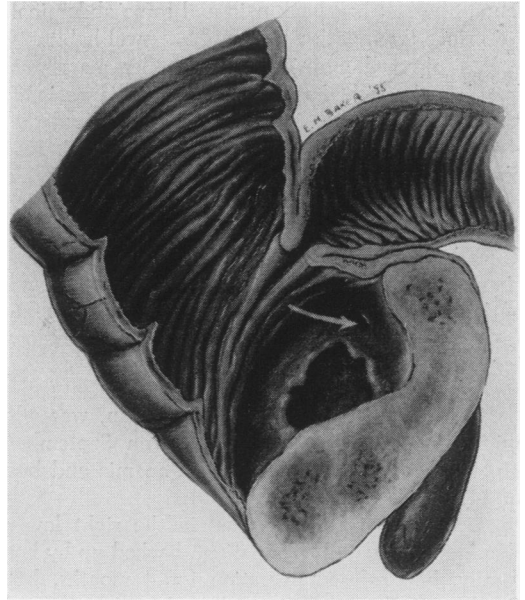


FIG. 3. Drawing of specimen in Case 4. Acute appendicitis secondary to blockage by a large ulcerating cecal cancer, with early abscess formation, probably appendiceal in origin.

lieve the prognosis to be excellent in two of them.

Another optimistic note about this discouraging group of cases is the fact that a radical operation may occasionally pay dividends, even in advanced cases involving long delay. In Case 10, drainage of an "appendiceal abscess" had been done elsewhere, and was repeated at The Roosevelt Hospital six months later. The true situation was not realized until carcinoma was discovered in the drainage tract after a further three-month delay. Radical resection, which included a large segment of abdominal wall, has resulted in an apparent cure, with the patient alive and well 10½ years later. Surprisingly good palliation was obtained in Case 13 by radical resection and a second attack on a large recurrence 3½ years later. The patient was clinically well a year after the second operation, and "alive with disease" six years after his first operation and 2½ years after the second. Such palliation in advanced cases is rare, and was surely attributable in Case 8 to the favorable nature of the rare type of tumor, a cecal carcinoid carcinoma. This enabled the patient to carry on in good condition for 7½ years.

CASE REPORTS

In the following seven cases, diagnosis of cecal cancer was made promptly at the time of the first operation:

Case 1. V. A., a 62-year-old woman, was admitted to The Roosevelt Hospital on August 13, 1953, with a complaint of abdominal pain and severe tenderness of 6 hours' duration and a history of loss of 15 pounds in weight during the preceding 3 months.

A diagnosis of acute appendicitis was made and operation was done as an "emergency" procedure. On incision, an abscess in the right lower quadrant was found, believed due to a perforated appendix. Appendicectomy with drainage was done, plus biopsy and cecostomy. A neoplasm was noted in the cecum, at the base of the appendix.

Twenty-six days later, a right colectomy was performed. The neoplasm was diagnosed as adenocarcinoma of cecum, Grade II, with involvement of the appendix and mesenteric fat, and implants on peritoneal surfaces.

The patient died 5 months later. Autopsy revealed extensive and scattered residual malignancy.

Case 2. E. D., an 82-year-old woman, was admitted to The Roosevelt Hospital on September 25, 1955, with a complaint of abdominal pain of one month's duration.

The patient reported that she had fallen 4 years previously and had fractured the 12th dorsal ver-

tebra. She had had back pain and some abdominal pain since then, with no change in bowel habits.

On physical examination, a tender mass was found in the right lower quadrant. A diagnosis of acute appendicitis with abscess was made and the patient was operated on as an "emergency". Exploration revealed suppurative appendicitis with perforation, due to blockage of the appendix by the cecal cancer. Immediate ileocollectomy was performed. The pathological diagnosis was adenocarcinoma of cecum, Grade II plus, involving the base of the appendix and extending into the pericecal fat.

Up to this writing, the patient has made slow but satisfactory recovery.

Case 3. K. R., a 73-year-old woman, was admitted to The Roosevelt Hospital on September 15, 1955, with a 3-year history of anemia and loss of 14 pounds in the past year.

Upon examination, a mass in the right lower quadrant was noted. The patient, backed up by her family, had refused operation for 4 months, but finally agreed when pain and tenderness appeared at the site of the mass.

At operation, a large cecal cancer was found that had grown across the base of the appendix, which had become acutely inflamed. A one-stage right ileo-colectomy was done (side-to-side anastomosis).

The pathological diagnosis was adenocarcinoma Grade II plus, of right colon, Duke C, with metastatic involvement of one regional lymph node.

The patient was discharged on October 2, 1955 and was doing very well when seen 2 months later.

Case 4. M. S., a 48-year-old man, was admitted to The Roosevelt Hospital on May 28, 1951, with a history of mild, repeated pain in the right lower quadrant of one month's duration and an increase of pain in the last 30 hours prior to admission.

An operation was performed for acute, diffuse suppurative appendicitis with carcinoma (gelatinous) implanted on the serosal surface of the appendix. The abscess was drained and the appendix removed. A second operation—right colectomy for carcinoma of the cecum—was done 25 days later.

The pathological diagnosis was adenocarcinoma of colon, Grade II, Duke C, with node involvement. The tumor was 15 cm. in diameter, with site of appendix markedly involved.

Ten and one-half months later, the patient was readmitted. He was feeling well but there was a non-tender mass in the right lower quadrant. Seven days later, the mass was excised, together with a small-bowel loop adherent to it; he was referred to Janeway Clinic for radiation therapy.

He was again hospitalized on September 21, 1952, with a three-day story of pain and moderate distention. He was relieved by enemas and was discharged as improved. He then took a downhill course and died on May 15, 1953.

Case 5. J. S., a 77-year-old woman, was admitted to The Roosevelt Hospital on March 12, 1954. She had been treated for carcinoma of the corpus uteri by x-radiation in September, 1951 and with radium in February, 1953. Excellent palliation had been obtained with some hope of cure.

On admission, the patient's temperature was 102°; W.B.C. count 12,400; with 86 per cent polys. A tender mass was found in the right lower quadrant and a diagnosis of appendiceal abscess was made.

At operation, the appendix was found to be acutely inflamed, with perforation and early abscess formation, and with base blocked by cecal cancer. An immediate right ileo-colectomy was done, in spite of the presence of pus. The pathological diagnosis was adenocarcinoma of cecum, Grade II, Duke B, with acute localized peritonitis and acute diffuse appendicitis (nodes negative).

At the present writing, approximately 21 months later, the patient seems quite well.

Case 6. C. Van B., a 66-year-old woman, was admitted to The Roosevelt Hospital on April 16, 1948, with a complaint of pain in the right lower quadrant, of 3 days' duration.

A vague mass was found in the right lower quadrant, and a diagnosis of acute appendicitis was made. A right colectomy was done after the discovery of an acutely inflamed appendix and a hard cecal mass.

The pathological diagnosis was adenocarcinoma of cecum, Grade II, Duke C, with one positive node and acute diffuse suppurative appendicitis. The cecal cancer was 3½ cm. in diameter, with 2 cm. ulceration, and blocked the appendix base.

The patient died on June 15, 1949 with enlarged liver and jaundice.

Case 7. M. W., a 73-year-old woman, was admitted to The Roosevelt Hospital on June 13, 1954, with a three-day history rather typical of acute appendicitis. She reported that she had had a large bowel tumor resected at another hospital, "several years ago".

A preoperative diagnosis was made of acute appendicitis, with peritonitis and ileus. A right ileo-colectomy (begun under local anesthesia due to poor condition) was done and a large amount of pus was found in pelvis, with a perforated gangrenous appendix and a cancer of the cecum blocking its base, as well as the ileum.

The pathological diagnosis was adenocarcinoma of cecum, Grade II, Duke C plus, with tumor emboli in veins, node involvement, and acute diffuse suppurative appendicitis with perforation at the base.

The patient died on the 19th postoperative day.

COMMENT ON CASES 1 TO 7

It is discouraging that of these seven patients, in whom the correct diagnosis was made at the first operation, only three are doing well, the longest current survival, without evidence of disease, being 21 months. However, we must remember that with cecal cancer, acute inflammatory manifestations usually mean advanced disease. We still feel that the first chance at these tumors is the best and that immediate resection should be done whenever feasible.

In the following six cases, the diagnosis of cecal cancer was delayed, usually necessitating multiple operations:

Case 8. N. B., a 40-year-old man, was admitted to The Roosevelt Hospital on July 28, 1941, on account of pain and a mass in the right lower quadrant. Three months before, appendectomy had been done (in another city) for "appendicitis", and the surgeon had described an "indurated cecum".

Prompt exploration revealed a mass in the cecum, adherent to a loop of the small bowel. Ileocolostomy was done. The pathological diagnosis was malignant carcinoid of cecum, with lymph-node involvement.

After doing well for 7½ years, the patient came back with obstruction due to widespread malignant disease. A palliative ileo-colostomy was done, with temporary relief to the patient, who died on March 22, 1950.

Case 9. W. H., a 61-year-old man, was admitted to The Roosevelt Hospital on February 22, 1949, after 24 hours of abdominal pain, which had been peri-umbilical at onset, with shift to both lower quadrants.

Physical findings suggested acute appendicitis. Prompt operation—appendectomy with drainage—revealed acute gangrenous appendicitis, with perforation and "free pus". Operative note records the fact that there was considerable "typhlitis" and that the base of the appendix could not be inverted.

The patient was discharged on the 9th postoperative day and was re-admitted about 9 months later, having lost 20 pounds.

Exploration revealed adenocarcinoma growing in the old incision in the abdominal wall, and a carcinoma of the cecum, with generalized metastases and *obstruction of the pylorus* caused by the metastatic disease. A palliative gastrojejunostomy was done and he was able to go home on the 16th postoperative day.

Case 10. M. McM., a 69-year-old woman, was admitted to The Roosevelt Hospital on November 15, 1944, with an abscess in the right lower quadrant. In May of 1944, she had been operated upon at another hospital for an appendiceal abscess (appendix not removed), and was discharged with moderate drainage from the wound, a barium enema reportedly having shown no evidence of neoplasm.

On admission (November 15, 1944), a large mass was felt in the right lower quadrant, and the appearance of the draining sinus also suggested a malignant implant. The abscess was again drained and on February 7, 1945, the wound was still draining, requiring 2 or 3 daily dressings. A barium enema, done 6 days later, was reported as showing no evidence of neoplasm. A 3rd operation—right colectomy, with removal of a large segment of abdominal wall—was performed 10 days later. The pathological diagnosis was gelatinous carcinoma of cecum, Grade II.

The patient made a good recovery but after 2 weeks, was re-admitted for a few days on account of vague abdominal discomfort. Only palliative treatment was necessary.

Ten years later, in August 1955, a friend reported that the patient (now 80) was still "alive and well except for old age".

Case 11. C. N., a 76-year-old man, was admitted to The Roosevelt Hospital Out-Patient Department, on November 10, 1943, because of lower abdominal pain and "cramps" of 2 months' duration. He had been admitted previously, in May of 1943, for study on account of "anemia and asthma".

At the time of the present admission, the patient was found to have a tender mass in the right lower quadrant and a W.B.C. count of 17,000. The mass and tenderness gradually disappeared and he was allowed to go home "on account of his age". (A barium enema and a G.I. series were reported as showing no evidence of neoplasm.)

Four months later, the patient was re-admitted with pain and tenderness in the right lower quadrant, the pain having been present for 6 days. A tender mass was felt.

An ileocolic resection was done and the patient died 2 days later. Death was attributed to "cardiac failure". The pathological diagnosis was carcinoma

of cecum, Grade II, with abscess involving the cecum, appendix, and two loops of the small bowel. At autopsy, the abdominal cavity was clean, and without evidence of residual disease.

Case 12. T. R., a 50-year-old woman, was admitted to The Roosevelt Hospital on August 9, 1940, with a history of 7 days of pain in the right lower quadrant and temperature of 103-104° daily.

Physical examination revealed an obese woman, with a very large mass in the right lower quadrant. At operation, a large abscess was incised and drained.

A fecal fistula appeared spontaneously on the 10th postoperative day, and the patient promptly improved. The fistula closed on the 26th postoperative day, and she went home on the 30th day, with the wound "practically healed".

She was re-admitted on December 12, 1940, having been at home in bed for many weeks with pain in the right lower quadrant, together with diarrhea, constipation, fever, and loss of weight. The old wound opened spontaneously with partial relief, and limited exploration showed widespread carcinoma in the right lower quadrant.

Case 13. J. R., a 46-year-old man, was admitted to The Roosevelt Hospital on April 11, 1945, on account of pain in the right lower quadrant. Two months previously, the patient had had an appendectomy done at another hospital, for "appendicitis". He had lost 14 pounds since then and experienced dull pain in the right lower quadrant. His bowel function was normal.

Physical examination revealed a moderately tender mass in the right lower quadrant, of "size of small grapefruit", a W.B.C. count of 11,000 and R.B.C. count of 4,150,000. A barium enema showed irregularity, "suggesting residual inflammation".

On the 9th day after admission, a right ileo-colectomy was performed for carcinoma of the cecum. The mass was 10 cm. in diameter. Pathological diagnosis was adenocarcinoma of the cecum, Grade II plus, with invasion of regional nodes.

The patient was discharged in May 1945, about 3 months later. He was re-admitted on December 8, 1948. He had lost 20 pounds in the past year, and for 4 months had noticed diarrhea and discomfort in the right lower quadrant.

Exploration showed no liver involvement but a large, recurrent malignant mass involving the region of anastomosis, as well as the retroperitoneal duodenum and loops of ileum. A second ileo-colectomy (and partial duodenectomy) was done. The right ureter was involved and was resected.

The patient was discharged, as improved, on January 16, 1949 and a letter from him in August

1949 reported that he "felt fine". On February 26, 1951, he was reported in poor condition at another hospital.

COMMENT ON CASES 8 TO 13

These six patients underwent 12 operations, largely due to the fact that the true nature of the underlying pathological lesion was not realized by the original operator.

Case 8 did well for seven and one-half years, due to the favorable nature of his tumor (cecal carcinoid carcinoma). In Case 13, good palliation was obtained by two rather heroic surgical attacks. However, the only one of the six that was apparently cured was Case 10, who had no less than three operations and seems to be well, more than ten years later. This encourages us in attempting curative surgery in advanced cases, even if it involves removing a large segment of the abdominal wall.

It was unfortunate that in Case 11, the advanced age and feebleness of the patient influenced us to postpone the needed surgery. After a delay of four months, the resection proved too much for him to withstand. Autopsy showed no residual carcinoma, and one cannot help thinking that he might have come through alright if an operation had been done four months earlier.

The only one of all the 13 cases reported above, in which a radical attack in the presence of a large amount of pus contributed to disaster, was Case 7. This patient had advanced and scattered cancer and it was a blessing that she did not survive longer. Nevertheless, major resection under the circumstances was surely unwise.

Our remaining four case reports are presented to illustrate problems that do not exactly fit our main theme, but that are closely related:

Case 14. J. D., a 68-year-old woman, was admitted to The Roosevelt Hospital on February 2, 1954, suffering from fulminating acute cholecystitis with many stipes. A cholecystectomy was done, and the patient made prompt recovery.

On May 18, 1954, she was re-admitted, with a tender mass in the right lower quadrant and complaint of abdominal pain of one week's duration. She was upset that the appendix had not been removed at the time of cholecystectomy. She was sure she was suffering from appendicitis, and so were we.

A diagnosis was made of appendiceal abscess but operation revealed a vicious cecal cancer, Grade IV, with lymph-node metastases. The appendix was quite normal. A right ileo-colectomy was done, with primary anastomosis.

The patient died approximately 5 months later from widespread carcinoma that progressed with amazing speed.

Case 15. J. C., a 23-year-old man, was admitted to The Roosevelt Hospital on October 26, 1939, with a history of 60 hours of pain, very suggestive of acute appendicitis.

An appendectomy was done as an emergency. The appendix was described as "edematous". Five days later, an emergency vent was established because of complete colonic obstruction, due to carcinoma 6 inches distal to the splenic flexure. Subsequently, a partial colectomy was done. Three months later, a hard mass developed in the old McBurney scar; biopsy showed adenocarcinoma.

The patient died on May 27, 1940 of abdominal carcinomatosis. Autopsy showed colonic *polyposis* with multiple carcinomata.

Case 16. B. S., a middle-aged woman, was admitted to The Roosevelt Hospital on January 30, 1942, with complaint of pain in the right lower quadrant of 7 hours' duration. Abdomino-perineal resection had been done in another hospital 2 years previously.

On admission, the patient had a W.B.C. count of 13,700 and 71 per cent polys. A diagnosis of acute appendicitis was made.

At operation, the base of the appendix was found to be bound up in malignant tissue, thought to be metastatic. Many other metastases were found. Drainage was established; no further operative procedure was thought to be indicated. Considerable pus drained from the wound postoperatively.

The patient was discharged on February 21, 1942 in good condition. Death occurred approximately 6 months later.

Case 17. J. W., a 64-year-old man, was admitted to The Roosevelt Hospital on February 18, 1945. Seven weeks previously, an abscess in the right lower quadrant had been drained at another hospital, and there had been continual drainage from the tract since that time.

Roentgenogram studies showed that the tract led into the cecum. An operation done on March 2, 1945 showed a chronically diseased appendix and a cecal mass. A frozen section reportedly showed only chronic inflammation, but later permanent section showed a tiny area of adenocarcinoma (in only one of several fragments removed).

On March 20, 1945, an ileo-colostomy was done. On April 24, 1945, a right colectomy was done, revealing that the "carcinoma of cecum" was in the region of the ileocecal valve and appendix base. On July 2, 1945, an operation showed metastatic carcinoma in the old abdominal wound, and roentgen therapy was advised.

Multiple abdominal masses, including liver involvement, subsequently appeared and the patient died on September 15, 1945.

COMMENT ON CASES 14 TO 17

Case 14 is representative of cecal cancers that give a typical picture of acute appendicitis, without causing it. Case 15 presents a patient operated on for acute appendicitis associated with cecal distention, secondary to annular obstructing cancer of the colon, distal and remote from the right lower quadrant. Case 16 involved appendicitis due to obstruction of the base of the appendix by *metastatic* tumor (primary in rectum), which is probably a very rare occurrence, although discussed by Costello and Saxton.⁵ In Case 17 (this patient was first operated on elsewhere), it is likely that we are dealing with perforation of a cecal cancer and that the changes in the appendix were due merely to involvement in the wall of the resulting abscess. This case is the only one of the group in which resection of the right colon was preceded by preliminary ileo-colostomy. This probably did not alter the outcome in any way.

In the presence of violent, acute inflammatory problems associated with cecal cancer, preliminary ileo-colostomy has certain very appealing features. If done, it probably should involve division of the ileum (bringing out the distal end as a vent) rather than being done in continuity.

There is of course the possibility that the neoplasm that obstructs the appendiceal base may be primary in the appendix itself.

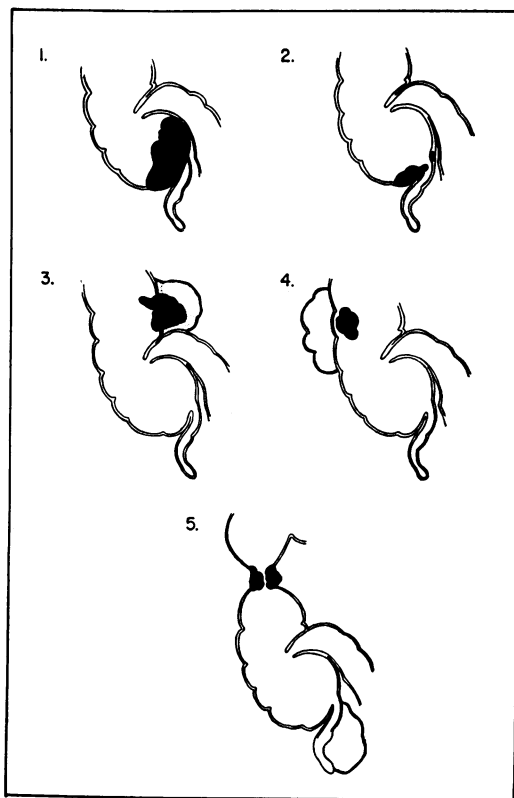


FIG. 4. Diagrammatic indication of various ways in which cancer of the right colon may cause or simulate acute appendicitis. (After Ewing, Reference #7.) Diagrams 1 and 2, blockage of base of appendix by tumor; diagrams 3 and 4, abscess due to gross or bacterial perforation; diagram 5, acute appendicitis secondary to back pressure from remote obstructing neoplasm.

In a recent review of the subject, Collins⁶ presents the results of a painstaking study of 50,000 human vermiform appendices. He found 632 primary malignant neoplasms of the appendix reported. Among these were 261 carcinoids, 270 of the colloid type that may produce "pseudomyxoma peritonei", 41 primary adenocarcinomata, and 27 lymphomas of various types. Of the cases reported by Wilkie,²³ the oldest of the patients in whom acute appendicitis was due to neoplasm primary in the appendix itself was only 22. Uihlein and McDonald²⁰ reported five cases of primary appendiceal cancer that simulated colonic cancer.

We must always remember that the ileocecal region is a notorious one for inflam-

matory masses that may be difficult to distinguish from carcinoma. Few experienced surgeons can look back on an active career that does not include at least one right colectomy performed in the mistaken impression that they were dealing with a neoplasm. Waugh²¹ reported on masses in the ileocecal region due to smoldering appendicitis, the commonest cause. Ferguson⁸ has reviewed those due to acute inflammation in cecal diverticula. Other possibilities in differential diagnosis are non-specific terminal ileitis, actinomycosis, slow perforation by foreign bodies, and tuberculosis.

Recurring right lower quadrant pain with tenderness, closely simulating appendicitis, may be due to obstructing colonic cancer even at a site remote from the cecum. The cecum, being the thinnest part of the colon, suffers most from the back pressure. The severe "attacks" follow the addition of inflammatory edema to the neoplastic narrowing of the colon, with transient completion of the near-obstruction. Cecal distention, at operation, may point to the correct diagnosis, but it is easy to be fooled by this additional confusing way in which colonic cancer may masquerade as acute appendicitis (Fig. 4).

Lastly, the cecal cancer itself, often bulky, ulcerated, and of long standing when discovered, may present the typical history and physical findings of acute appendicitis, with subsequent exploration revealing a perfectly normal appendix. The more rapidly-growing cecal cancers frequently do this, and either gross perforation or bacterial perforation of the cecal wall is likely to be present.

When the operator has established the fact that an unexpected cecal cancer is present, with resulting acute appendicitis, the decision as to the procedure of choice depends on the extent of peritoneal involvement. In the presence of a large foul abscess, drainage alone may be best as a preliminary procedure; otherwise, there are several obvious alternatives. He may perform a side-to-side ileo-colostomy, planning

to resect later; he may divide the ileum, perform an ileo-colostomy, either bringing the terminal ileum out as a fistula, or turning it in (the last surely very unwise); or, he may elect to do a primary resection even in the presence of peritonitis. The latter course, we feel, is the wise one, for a better opportunity to cure the patient will not come along. In our more recent patients, we have been pleased with the results of this policy. Since few hepatic flexures are at a high level, ample access for adequate resection can usually be obtained by extending a McBurney incision medially across the right rectus sheath and muscle. It is unwise to extend it laterally and upward, but there is no reason why the small incision cannot be closed and a new, large one made.

SUMMARY AND CONCLUSIONS

1. A review of 17 case histories at The Roosevelt Hospital having to do with the association of appendicitis and cecal cancer emphasizes the typical delay in diagnosis, the multiple operations, and the poor prognosis in these cases.

2. A review of the literature confirms the impression that earlier diagnosis and better results should follow greater awareness of the rather common association of appendicitis and cecal cancer. The acute appendicitis may even be considered a fortunate sequel of the location of the neoplasm, making a silent cecal cancer announce its presence.

3. A plea is made for early and radical operations in these cases. Although preliminary drainage may be necessary with some of the foul abscesses that have been present for some days, in most cases of co-existing cecal cancer and acute appendicitis (even with perforation), the first chance at cure is likely to be the best chance.

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DISCUSSION.—DR. JAMES D. RIVES, New Orleans, La.: About a year ago I discussed Dr. Patterson's cases with him personally and was very much interested in his aggressive attack. When I heard that he was going to present this paper I had Dr. Irving Beychok, one of our residents at Charity Hospital, look up our cases so that we could compare our results with his.

In a period of fifteen years there were 151 cases of carcinoma of the cecum. Of these, 86 were operated upon and in 22 instances (one-fourth of the total) the operation was performed as an emergency with a diagnosis of an acute abdominal condition. In six cases the diagnosis was acute appendicitis. In seven it was ruptured acute appendicitis or carcinoma of the cecum with perforation. In nine instances the diagnosis was small bowel obstruction and in one it was acute pelvic inflammatory disease. We were more impressed with the mimicry of acute abdominal conditions by carcinoma of the cecum than with the instances of acute appendicitis associated with, or caused by, the malignant lesion.

In 1941, Dr. Samuel A. Romano, of our department, made a study of the presenting symptoms of carcinoma of the colon at Charity Hospital and found that contrary to most reports on the subject, pain and tenderness in the right lower quadrant were the commonest signs and symptoms of carcinoma of the cecum (60 per cent of the cases).

We have usually followed a more conservative, or perhaps I should say a more timid policy than that advocated by Dr. Patterson. In most instances we have done an ileo-transverse colostomy and resected the right colon in ten days to two weeks after the emergency procedure. After reviewing Dr. Patterson's results I am sure that a more aggressive attack has some advantages and few, if any, disadvantages. A two-stage procedure undoubtedly favors the spread of the malignancy to the peritoneum and perhaps also to the lymphatics or the liver. With the satisfactory control of infection by means of the antibiotics, the danger of resection of the bowel in the presence of acute infection has certainly been minimized if not completely eliminated. Furthermore, resection of the right colon is more similar to small bowel resection than

to resection of the left colon. The peritonealized wall of the ileum can be anastomosed to a peritonealized surface of colon without interposed subperitoneal fat, and the intestinal contents which pass through the anastomosis are liquid rather than solid. In view of these facts I am convinced that our timid approach to the problem is now unjustified, and that Dr. Patterson has made a substantial contribution to the handling of these difficult lesions. In the future we propose to follow his more aggressive attack and confidently expect that our results will be improved.

DR. A. STEPHENS GRAHAM, Richmond, Va.: I have enjoyed both of these papers. I wish, however, to confine my remarks to the one by Dr. Patterson. It has been my practice for many years to close the abdomen on finding an unsuspected carcinoma of the cecum, doing an ileo-transverse colostomy and subsequent resection. But recently I have usually gone ahead with the radical resection at the time of exploration. Within the past two or three years I have had three patients with unsuspected carcinomas, and also definite, purulent appendicitis in two instances. Two of the lesions were at the junction of the cecum and the ascending colon; one was a large, fungating growth which caused intussusception, and there was gangrene of the appendix and a portion of the cecal wall as well. In all three of these I carried out radical resections. There was no wound infection, but an abscess of the peritoneal cavity had to be drained in two instances. Convalescence was not prolonged very much (they were discharged the 16th and 18th postoperative days respectively) but it was nevertheless a little discouraging.

I believe the solution of this problem has in part been solved by Poth. At a recent meeting of the College of Surgeons in Chicago he was kind enough to show me his unpublished statistics on the use of Neomycin injected into the colon, 500 to 1000 cc of a 1% solution at the time of resection. No other antibiotic was employed pre- or postoperatively. There were 10 or 12 cases of resection for acute large bowel obstruction, without a death or abscess formation and, as I recall, without wound