

3-1972

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Recommended Citation

Grodsinsky, C.; Soares, J.; Block, M. A.; and Brush, B. E. (1972) "The Role of Surgery in Cecal Diverticulitis," *Henry Ford Hospital Medical Journal* : Vol. 20 : No. 1 , 33-40.

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The Role of Surgery in Cecal Diverticulitis

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Cecal diverticula, although rare, may result in acute or chronic diverticulitis. Rarely does acute hemorrhage arise from cecal diverticula. The diagnosis of acute diverticulitis usually is evident at operation and an appropriate resection is usually feasible, although the local status and general condition of the patient modifies treatment in some instances. Chronic cecal diverticulitis is usually difficult to distinguish from carcinoma and a resection is justified.

Symptomatic cecal diverticula mimic other more common pathological lesions such as appendicitis and carcinoma. Since the presence of the disease often is recognized first in the operating room, surgeons must then decide the nature and extent of the surgical procedure that must be done. Our experience with ten cases of cecal diverticulitis indicates that individualized management is based on extent of peritonitis and condition of the patient.

From a clinical and surgical standpoint, disease arising from cecal diverticula may be grouped into three main categories:

- I. Acute cecal diverticulitis as in "acute abdomen", indistinguishable from other inflammatory conditions in the right abdomen.
- II. Chronic cecal diverticulitis simulating malignancy.

III. Acute gastrointestinal bleeding or chronic blood loss from cecal diverticula.

1. Acute Cecal Diverticulitis:

Our experience with eight patients with acute cecal diverticulitis is presented in the following case abstracts.

Case No. 1: A 21-year-old white man, with a two-day history of right lower abdominal pain, was admitted through the Emergency Room on November 21, 1965. Positive physical findings included a temperature of 99.4°F, tenderness and rebound in the right lower quadrant, and rectal tenderness on the right. The white blood cell count was 10,000/cu mm and urinalysis was within normal limits. The patient underwent operation following diagnosis of acute appendicitis. Although the appendix appeared normal, an inflammatory mass involving the cecum was found 1.5 cms from the ileocecal valve. Appendectomy and wedge resection of the cecal mass was done. The pathological report confirmed diagnosis at operation of acute cecal diverticulitis. His postoperative course was uneventful.

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Case No. 2: A 40-year-old white man was admitted on September 15, 1965, with a two-day history of epigastric and subcostal pain, diarrhea, and vomiting.

His temperature on admission was 99.2°F. Positive physical findings consisted of right upper quadrant guarding and tenderness. The white blood cell count was 6,800/cu mm; serum amylase was 96 units, and urinalysis was within normal limits. The patient was admitted with a diagnosis of acute cholecystitis.

Under observation for one day, the patient reported pain localized to the right lower quadrant with rebound tenderness at McBurney's point. Rectal examination indicated tenderness on the right. The white blood cell count increased to 10,800/cu mm. With a diagnosis of acute appendicitis, the patient underwent surgical operation using a Rocky-Davis incision. The cecum appeared to be acutely inflamed, while the appendix was normal. No excisions were done on either the appendix or cecum. The patient then was treated conservatively postoperatively and discharged on the fifth postoperative day. Followup for two years was uneventful.

Case No. 3: A 62-year-old white woman, with a cecal diverticulum evidenced two years previously (Figure 1), was admitted



Figure 1—Case No. Three

on April 27, 1964, because of two days of pain in the right lower quadrant.

On admission, the patient was afebrile, had marked tenderness and rebound at McBurney's point, but showed a normal white blood cell count. The admitting diagnosis was acute appendicitis or acute diverticulitis.

Exploratory surgery through an infra-umbilical transverse incision indicated an acutely inflamed cecal diverticulum with marked induration of the lateral cecal wall. The appendix was normal.

Resection of the cecum and terminal ileum was performed with end-to-end anastomosis of the ascending colon and terminal ileum. The specimen revealed that the ostium of the cecal diverticulum was occluded by faecalith. Study of microscopic sections confirmed the diagnosis of acute cecal diverticulitis. The postoperative course was uneventful.

Case No. 4: A 70-year-old white woman, who had sustained cerebral thrombosis in the past, reported a two-day history of epigastric pain which was localizing to the right lower quadrant.

She was afebrile, had tenderness and rebound at McBurney's point, a white blood cell count of 6,750/cu mm with a normal differential, and a negative urinalysis. The admitting diagnosis was acute appendicitis.

Exploratory operation through a right paramedian incision indicated a normal appearing appendix and a severely inflamed cecal wall. The appendix and cecum were left undisturbed. The patient had an uneventful postoperative recovery. A followup barium enema ten days later demonstrated the presence of cecal diverticula (Figure 2).

Case No. 5: This 43-year-old white man was admitted to the hospital with a history of peri-umbilical pain which gradually localized to the right lower quadrant during the previous three days.

At the time of admission, he had a temperature of 100.4°F and severe tenderness and rebound tenderness in the right lower quadrant of the abdomen. The white blood cell count was 20,250/cu mm with a shift to the left by differential count. Urinalysis was within normal limits. The clinical diagnosis was acute appendicitis.

An exploratory operation through a right transverse abdominal incision indicated a normal appearing appendix. However, there was a retrocecal abscess with a cecal diverticulum at the base. An appendectomy was performed and the abscess drained. His postoperative course was uneventful.

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Figure 2—Case No. Four

Case No. 6: A 78-year-old white man came to the Emergency Room with right lower quadrant discomfort and evidence of right lower quadrant tenderness with rebound tenderness. He had a history of peptic ulcer disease, confirmed by an x-ray study of the upper gastrointestinal tract.

With a diagnosis of acute appendicitis,

an exploratory operation was performed. The appendix appeared normal but there was a gangrenous diverticulum in the cecum (Figure 3). Since there was considerable induration, it was difficult to eliminate the possibility of a perforated malignancy. Therefore, a right colectomy was performed. The pathologists reported the presence of



Figure 3—Case No. Six

necrotizing cecitis. His postoperative course was uneventful and he experienced no further problems.

Case No. 7: A 34-year-old white man complained of right abdominal pain for approximately 28 hours before coming to the hospital. He experienced no nausea or vomiting, but had noted anorexia. The white blood cell count was elevated; he was febrile, and abdominal tenderness was present superiorly and laterally to McBurney's point. Retrocecal appendicitis was suspected and an operation was performed. The appendix was found to be normal, but a sealed-off perforation of a cecal diverticulum was present. A modified right colectomy was done. Postoperatively, the patient developed a wound infection but recovered satisfactorily otherwise.

Case No. 8: A 48-year-old white woman was admitted to the hospital after two days of pain in the right lower quadrant of the abdomen. The pain was constant, aching,

did not radiate, and was aggravated by motion. She noticed nausea but no vomiting.

Examination of the abdomen showed tenderness in the right lower quadrant with minimal rebound tenderness. Operation was performed following diagnosis of acute appendicitis. A 4 x 4 cm area of induration was found in the lateral wall of the cecum directly opposite the ileo-cecal valve. This area appeared inflamed but since its nature could not be determined a modified right colectomy was performed. The pathologists reported acute diverticulitis of the cecum. The patient experienced an uneventful postoperative course.

The infrequent occurrence of cecal diverticulitis and the resemblance of its manifestations to the more common lesion of acute appendicitis makes the latter the usual primary preoperative

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diagnosis for these patients (Cases 1-8). Of the 318 cases of cecal diverticulitis reviewed by Wagner and Zollinger in 1961,¹ only 5.3% were correctly diagnosed preoperatively. A correct preoperative diagnosis of acute cecal diverticulitis is most likely in the patient who has had an appendectomy or whose cecal diverticula had been revealed in the past by barium enema. (Case No. 3). This limited group of patients may be treated conservatively since only 5% are reported to develop generalized peritonitis secondary to perforation of the inflamed cecal diverticulum.²

At laparotomy, cecal diverticulitis, like acute appendicitis, presents varying degrees of inflammation. Most often the diagnosis is obvious and a segmental excision should suffice. However, when the degree of induration is severe, the possibility exists of a carcinoma. Greaney and Snyder³ estimated that one-third of the cases are of the "hidden type". They advise a right colectomy. Cecotomy and examination of the mucosa is a useful procedure, but its advantages have to be weighed against the risk of possible fecal contamination, dissemination of malignant cells, and unnecessary delay of the operation.

Since acute appendicitis was the preoperative diagnosis, eight of our ten cases of cecal diverticulitis were emergency operations. Although the surgical procedure varied greatly, in most instances the local situation and the patient's condition permitted some type of resection. In one case, treatment consisted of simple diverticulectomy with wedge resection of the base of the cecal diverticulum. In two cases, the

degree of inflammation was moderate and the treatment consisted of excision of the cecum and the terminal ileum with end-to-end anastomosis. Two cases were treated by right colectomy. One case of a perforated cecal diverticulum with a localized abscess was treated by adequate drainage. In two cases, we elected to close the abdomen, leaving the cecal diverticula and appendix intact. No patients experienced any major postoperative complications.

II. Chronic Cecal Diverticulitis:

The two patients manifesting chronic cecal diverticulitis presented the following features:

Case No. 9: A 58-year-old white man with vague upper abdominal pain, had a persistent round filling defect in the cecum, revealed by barium enema study during gastrointestinal investigation. The clinical impression was either mucocele of the appendix or lipoma.

An exploratory operation through a right transverse incision uncovered a soft tumor mass involving the appendix and cecum. It was resected. Pathology reports indicated a chronic inflammation of the wall of the cecum with an incidental finding of diverticula of the appendix (Figure 4).

Case No. 10: While in the hospital for treatment of right shoulder pain due to a peritonitis, a 59-year-old white man was found to have mild diabetes, polycythemia, and a mass in the right lower quadrant. X-ray studies indicated the mass was in the area of the cecum. With a diagnosis of possible malignant lesion, an operation was performed. Exploration of the abdomen revealed a hard, apparently inflammatory mass in the cecum, involving the terminal ileum. This had adhered to the iliac bone creating chronic osteomyelitis. Following an extensive right colectomy, the pathological report showed diverticulitis of the cecum with abscess formation and a diverticulum in the appendix.

Postoperatively, the patient developed a wound infection which eventually cleared.

Chronic cecal diverticulitis presents a less urgent problem than the acute

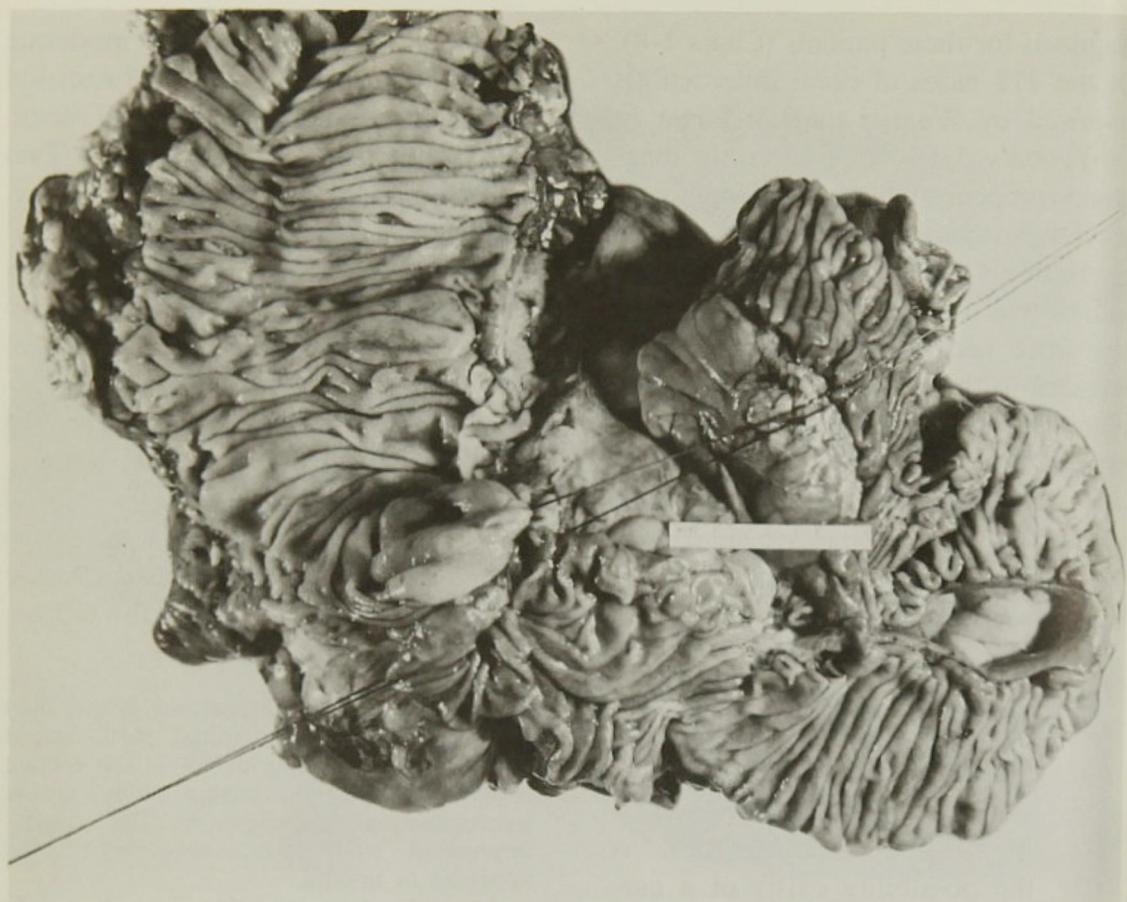


Figure 4—Case No. Nine

variety. Physical examination of the chronic patient may reveal abdominal pain and/or a mass. Barium enema studies or colonoscopy may show alterations that are indistinguishable from malignancy of the cecum. It is also difficult to distinguish a chronic granulomatous inflammation arising in the appendix⁴ from chronic cecal diverticulitis. Because of the inability to exclude a malignancy even at operation, a right colectomy is performed frequently when chronic cecal diverticulitis is present.

III. *Gastrointestinal Hemorrhage Associated with Cecal Diverticulae:*

Ulceration in cecal diverticulae has

been shown to be the cause of massive GI bleeding.⁵ Although we have treated patients with bleeding associated with extensive diverticulosis of the colon, including the cecum, none of the cases in this report required operation for massive hemorrhage from isolated cecal diverticulae.

Discussion

The first reported case of diverticula of the cecum evidently appeared in the 1863 catalogue of the pathological specimens of the Hunterian collection of the Royal College of Surgeons.⁶ Oschner and Barger⁷ estimated that the frequency of cecal diverticula in the general population is 1.7%. Leicht-

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Table I

INCIDENCE OF CECAL DIVERTICULAE

Anderson (Mayo Clinic 1947)	9 among 700 cases of surgically treated diverticulitis
Greaney and Snyder (1957)	14 in a review of 6,781 emergency laparotomies
Rodkey and Hermann (1961)	269 left colon diverticulæ and 14 right colon diverticulæ in a 20-year review of diverticular disease

ling⁸ considered that inflammation of cecal diverticula occurs in 0.1% of all cases of diverticulosis of the colon. With what frequency cecal diverticula become symptomatic is not known, but it is a rather uncommon entity (Figure 5). Kurosu⁹ reported diverticulitis to be more common in the right than the left colon in Japan.

It is likely that cecal diverticula are usually congenital in origin. Some authors^{10,11} claim that this formation of the lesion may be predisposed by a simple ulcer of the cecum. Among

other lesions primarily affecting the cecum, necrotizing cecitis may play a role in the development of solitary diverticulum of the cecum (Figure 3). In our series of patients both sexes were equally affected.

Our experience indicates that cecal diverticulitis presents difficulty in diagnosis and management both preoperatively and at operation. Surgical judgement is necessary to individualize therapy. Decision should rest primarily on whether an appropriate resection is indicated and safe for the patient.

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