Rectal Hemorrhage: *
Moderate and Severe

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RECTAL hemorrhage presents a serious and frequently very troublesome diagnostic and therapeutic problem. The dramatic course and frequent hazard to life of bleeding from the esophagus, stomach and duodenum has focused attention upon that problem almost to the exclusion of adequate consideration of hemorrhage from the small intestine and colon. Yet bleeding at stool is a frequent symptom usually indicative of serious disease, and not infrequently so profuse as to be truly exsanguinating. One can bleed to death just as surely and just as rapidly from a colonic vessel as from one of no greater size in the duodenum.

Gross rectal bleeding presents an even more difficult diagnostic challenge, and may well be just as dramatic, as that from the upper gastro-intestinal tract. Stone,[47] in 1944, described the situation in these words: "A person who believes himself to be in ordinary good health is suddenly seized by an urgent desire to defecate, accompanied by a marked feeling of faintness. Sometimes the faintness precedes the bowel movement, sometimes it follows it. When the evacuated material is looked at it is seen to be largely or wholly composed of blood. The blood may be bright red, brownish red or tarry. Usually there are one or more subsequent similar evacuations extending perhaps over two or three days. Then the process usually stops spontaneously, leaving the patient pallid and weak and badly frightened."

The literature is replete with references to bleeding from the upper gastro-intestinal tract and recent years have seen an increasing number of papers relating to rectal hemorrhage. An exhaustive review of the subject is beyond the scope of this paper, but a few references may be in order. One of the earliest definitive papers was that of Stone.[47] He divided 72 cases from the Johns Hopkins Hospital and the Union Memorial Hospital in Baltimore into three groups: 31 without discernible cause, 20 with possible explanation (including 8 cases of diverticulosis) and 21 cases with proven causes. He accepted diverticulosis as one of the causes for hemorrhage.

Other papers relating to the diagnosis and treatment of rectal hemorrhage or melena are those of Thompson and McGuffin,[48] Rives and Emmett,[35] Moore,[25] Kitchen[16] and Grimes.[11] A paper by Peters[29] is particularly valuable for its comparison of the findings in children and adults. Scarborough[41] presented a most interesting analysis of the evidence for and against diverticula as a source of bleeding and emphasizes polyps and carcinoma as the most frequent bases for hemorrhage.

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His 89 patients were observed for an average of 2.3 years, under the diagnosis of diverticular disease but 41 of these proved to have adenocarcinoma; 32 had adenomatous polyps removed by laparotomy, and 16 polyps were removed through the sigmoidoscope. He presented an excellent plan of study and emphasized the danger of too readily attributing rectal bleeding to diverticular disease without sufficient consideration of the possibility of neoplasia. Rowe and Kollmar[40] studied the incidence of carcinoma in association with colonic diverticulitis and presented evidence for much greater frequency of bleeding from carcinoma than from diverticular disease.

Much controversy has arisen over the frequency and the severity of hemorrhage in association with diverticulosis and diverticulitis. One of us (Noer[27]) summarized 41 cases of severe bleeding from colonic diverticula reported in 18 papers published between 1942 and 1954. (For brevity, these and most other pertinent references available in the bibliography of that paper are not again quoted here.) Additional references to bleeding in diverticular disease are those of Mobley, Dockerty and Waugh,[24] Rosser,[37, 38] Quinn,[30] Quinn and Ochsner,[31] Fansler,[8] Young and Howarth[51] (who illustrated a most interesting specimen of an inverted and ulcerated diverticulum), Hoar and Bernhard,[12] Keith and Rini,[15] and Stahlgren and Ferguson.[45]

Many have denied that hemorrhage, particularly severe in degree, is anything but a rare occurrence in diverticular disease. The statement is frequently made that this diagnosis is usually achieved by exclusion rather than by proof, and in many instances this is indeed true. Judd and Pollock,[14] in 1924, reported 118 cases from the Mayo Clinic with but 22 of them showing blood in the stool. They reported no exsanguinating hemorrhage and stated their belief that bleeding is more characteristic of carcinoma than of diverticulitis. Friedenwald and Feldman,[10] in 1935, presented an historical review of diverticulosis and diverticulitis, and analyzed 50 of their own cases. They expressed the opinion that bleeding is common in carcinoma, rare in diverticulitis. Rankin and Grimes,[32] gave a very complete discussion of diverticulitis and its complications based on 227 cases from the Mayo Clinic, plus 27 seen between 1933 and 1938. They considered bleeding the more common symptom of cancer, but believed that without roentgenologic or clinical evidence this is insufficient to make such a diagnosis, "for bleeding from diverticulitis alone is almost as common a happening." They conclude: "The consideration and treatment of gross exsanguinating hemorrhage will seldom excite attention. The thing just does not occur, except with exemplary rarity." Ransom,[33] Young and Young,[50] Patterson,[28] and DeCosse and Amendola,[7] all expressed doubt as to a diverticular basis for massive bleeding.

Recent years have seen an increasing trend toward early operative resection of involved areas of the colon for diverticular disease. Proponents of this more aggressive approach to diverticular problems have included Welch, Allen and Donaldson,[49] Cate,[5] Lewis and Hurwitz,[20] Bell,[2] Bartlett and McDermott,[1] Starkloff and Bindbeutal,[46] and Johns.[13] The emergency operative treatment of acute hemorrhage has been the subject of several reports including those of Moos,[26] Carpenter and Connolly,[4] and Maynard and Voorhees.[21] Diversion of the fecal stream has been proposed by Knight,[17] Foster and Fisher,[9] and Chenoweth.[6] Spiesman,[44] in an excellent editorial, referred to available conservative measures for the treatment of acute hemorrhage, and supports Kunath's[19] suggestion of a Gelfoam-thrombin-neomycin mixture injected into the bleeding bowel. Maynard and Voorhees[21] reported a most ingenious approach used in re-

TABLE 1. *Gross Rectal Bleeding, 1955–1960*

Louisville General Hospital	129
Louisville Veterans Administration Hospital	116
Total	245

operation upon a patient with severe hemorrhage. They milked the blood out of the colon through a rectal tube, applied rubber shod clamps at 10-cm. intervals along the entire colon and were thus able to demonstrate a bleeding segment which they entered to identify a spurting vessel, which was then controlled by ligation. Quinn[30] suggested a similar procedure, using four such clamps to isolate four parts of the colon. Brasfield[3] has recommended a "blind" right colectomy under certain circumstances, but the preponderance of left sided lesions would make this suggestion questionable in our opinion.

Finally, reference should be made to the mesenteric small intestine as a possible additional source of rectal bleeding. River, Silverstein and Topp[34] presented an exhaustive review of this subject and additional data relating to small bowel lesions were presented by Shandalow,[43] McHardy, Bechtold and McHardy,[23] McComb and Pridgen,[22] Kozoll, McMahon and Kiely[18] and Segal, Scott and Watson.[42]

In an effort to clarify the situation in our own minds, all adults with gross rectal bleeding admitted to the University of Louisville Hospitals during the six-year period, 1955–60, have been analyzed. Included in this series are only patients with gross bleeding recognizable as such at stool. Minimal bleeding of the type commonly encountered with hemorrhoids and other anal lesions has been excluded from the series as has been that from esophagus, stomach or duodenum. In other words, all patients included in this series had proof or presumptive evidence that the source of bleeding was distal to the ligament of Treitz. The group was considered under two categories, severe rectal hemorrhage and mild to moderate bleeding. Only patients who have required emergency blood replacement with or without clinical evidence of hypovolemia, have been classed as "severe." Despite evidence of significant blood loss, patients lacking one or both of these criteria have been listed in the "moderate" category.

There were, in all, 245 patients, 129 of them from the Louisville General Hospital, and 116 from the Louisville Veterans Administration Hospital (Table 1). It is of considerable interest that the experience in the two institutions was quite similar with respect to etiologic bases with the exception of two categories: The Louisville General Hospital, with an older patient population and a more active emergency service received more patients with severe hemorrhage from colonic diverticula, while the Veterans Administration Hospital, as might be expected, had nearly three times as many patients with ulcerative colitis. With these two exceptions there was a remarkable parallelism between the two patient groups as will be seen in Table 2.

Table 2 summarizes our experience and compares the sources of moderate and severe hemorrhage. The four most frequent causes of gross bleeding were cancer of the left colon, diverticulosis, ulcerative colitis and polyposis (single and multiple listed together). Diverticulitis and cancer of the right colon were each responsible for several cases, but all other types of

TABLE 2. *Rectal Bleeding (all), Louisville Gen. Hosp. and Louisville V.A. Hosp., 1955–60*

	Total	Moderate	Severe
Cancer left colon	75	73	2
Diverticulosis	62	45	17
Ulcerative colitis	39	39	0
Polyps	25	23	2
Diverticulitis	16	16	0
Cancer right colon	14	13	1
Miscellaneous (1 each)	14	12	2
	245	221	24

hemorrhage were represented by one of each. These included "radiation effect," prostatic cancer invading the rectum, sarcoma of the rectum, "colitis," carcinoma of the rectum together with a polyp and diverticulosis, carcinoid of the rectum, neurofibroma of the jejunum, volvulus of the small intestine, volvulus of the large intestine, regional enteritis, ileocolitis, and one case clearly of lower intestinal tract origin but with etiology never clearly determined. The frequency of bleeding from diverticulosis and cancer of the colon far exceeded that from other causes. (Cancer of the left colon, for this report, includes transverse, descending and sigmoid colon and rectum. Cecum and ascending colon are both classed as "right colon.")

Table 3 lists the sources of mild to moderate gross rectal bleeding (see also Fig. 1). The predominant position occupied by carcinoma of the left half of the colon is immediately apparent. This is, of course, in accord with the traditional teaching that gross rectal bleeding should always suggest the possibility of cancer. Next in frequency of occurrence were diverticulosis and ulcerative colitis, in that order. These two groups reveal the only significant differences between the experience in the two hospitals: diverticulosis was more frequently encountered in the older age group at the Louisville General Hospital while ulcerative colitis was three times as frequent at the Veterans Administration Hospital. Polyps accounted for but 23 of the 220 cases of moderate bleeding, while diverticulitis and cancer of the right colon were the only other conditions encountered more than once.

TABLE 3. *Rectal Bleeding—Moderate, Louisville Gen. Hosp. and Louisville V.A. Hosp., 1955–60*

		LGH	LVAH
Cancer left colon	73	38	35
Diverticulosis	45	28	17
Ulcerative colitis	39	10	29
Polyps	23	10	13
Diverticulitis	16	9	7
Cancer right colon	13	6	7
Miscellaneous (1 each)	12	8	4
	221	109	112

Severe hemorrhage is the subject of Table 4 and Figure 2. Included in this category are only those who required several transfusions and those who gave clinical evidence of hypovolemia. Many of the patients listed in the "mild to moderate" group actually bled to the point of severe anemia, but we classed as "severe" only those whose hemorrhage, of itself, posed a serious threat to survival. The fact that di-

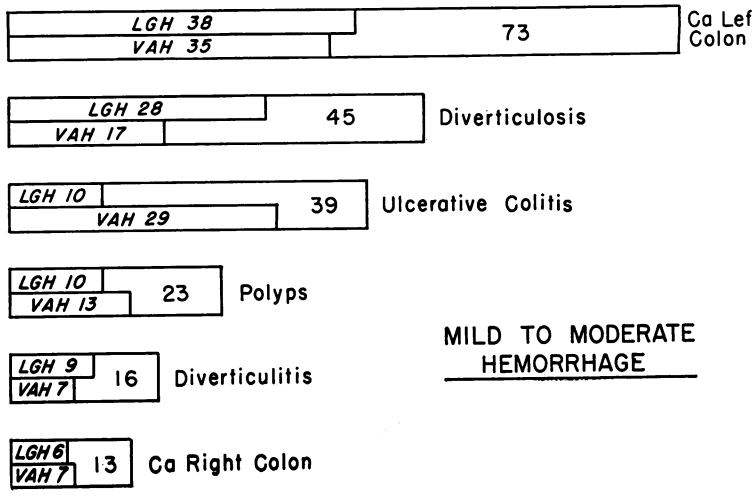

FIG. 1. Relative frequency of sources of mild to moderate hemorrhage.

TABLE 4. *Rectal Bleeding—Severe, Louisville Gen. Hosp. and Louisville V.A. Hosp. 1955–60*

		LGH	LVAH
Diverticulosis	17	13	4
Cancer left colon	3	2	—
Polyps	2	2	—
Cancer right colon	1	1	—
Sarcoma rectum	1	1	—
Undetermined cause	1	1	—
	25	20	4

verticulosis was responsible for 70.8 per cent of these is of great significance. More than twice as many patients bled severely from diverticulosis than from all other causes combined. Polyps, generally considered to be a common source of massive hemorrhage, were responsible for but two such occurrences among our 245 patients.

Figures 3 and 4 demonstrate further the relationship between moderate and severe bleeding from various causes. Figure 3 emphasizes the fact that roughly one-fourth of all bleeding from diverticulosis was severe, while nearly all of the bleeding from cancer of the colon was mild to moderate in degree. Figure 4 compares the sources of severe rectal hemorrhage and again emphasizes the frequency of severe diverticular bleeding.

Of considerable interest are the descriptions in the histories and the observations of attendants relative to the appearance of blood observed at stool. Melena is defined by Dorland as "the passage of dark, pitchy, and grumous stools seen with blood pigments or with altered blood." The statement is often made that black or tarry stools indicate an upper gastro-intestinal source, yet in this series of 245 cases with demonstrated or presumptive evidence of bleeding sources beyond the ligament of Treitz, 55 of the records refer to "black" or "tarry" stools. Table 5 reveals that nearly one-fourth of the entire series gave a history of melena.

Further information on the patients with severe rectal bleeding is of interest and their histories are summarized as follows:

Diverticulosis (Pathologic study confirmed diagnosis in 10 of 17)

T. C., Age 70. Admitted in very poor condition with severe rectal hemorrhage. A right transverse colostomy was carried out. No further bleeding. Patient's condition considered contraindication to resection.

D. J., Age 86. Right transverse colostomy for severe rectal bleeding, with a resultant cessation of hemorrhage. A limited resection of diverticulum-bearing transverse colon was carried out later with re-anastomosis of the colon. The patient recovered. Resected specimen showed only diverticula and no other disease.

M. M., Age 56. Admitted with arteriosclerotic gangrene of both feet, in very poor condition. While in the hospital she suffered a severe rectal hemorrhage. Right transverse colostomy caused cessation of the bleeding, which did not recur until terminally, 35 days later. No autopsy.

F. H., Age 70. Right transverse colostomy was carried out for severe rectal bleeding, which thereafter ceased. Her condition was adjudged inadequate for resection and she was discharged with the colostomy.

M. J., Age 76. Admitted with hypertensive cardiovascular disease, bronchial pneumonia and severe rectal hemorrhage. Her condition critical, no operation was carried out. She died five days after admission and autopsy showed only blood filled diverticula and free blood in the colon. Careful search revealed no other colonic lesion.

L. R., Age 82. Admitted with "stroke" and weakness following severe rectal hemorrhage, with a diagnosis of diverticulosis. He received four pints of blood, and on bed rest his bleeding stopped. He was discharged to a nursing home, but re-admitted two days later, exsanguinated, and died of hemorrhage within 15 minutes. No autopsy.

TABLE 5. *Melena, Black or Tarry Stools*

Louisville General Hospital	35 of 129	27 %
Louisville V.A. Hospital	20 of 116	17 %
	55 of 245	22.4%

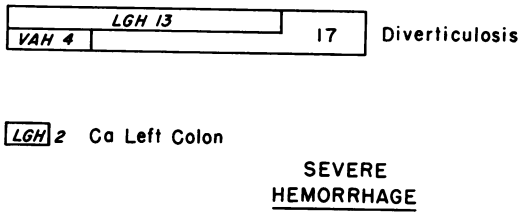

FIG. 2. Relative frequency of sources of severe hemorrhage.

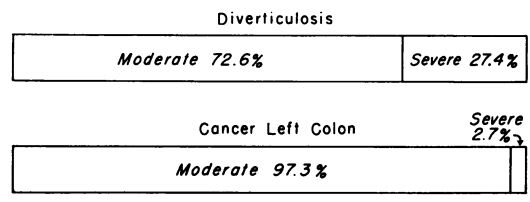

FIG. 3. Relative severity of bleeding in diverticulosis and cancer, the two most common sources of hemorrhage.

C. C., Age 66. Admitted with congestive heart failure, anemia, diverticulosis. She had been studied previously for rectal hemorrhage and resection advised but refused. She again suffered a severe rectal hemorrhage, went into shock in the hospital during severe hemorrhage and died. No autopsy.

E. W., Age 69. Diverticulosis, extensive, with severe hemorrhage from the rectum. A resection of the left colon resulted in cessation of hemorrhage for two years. She returned two years later, again with severe hemorrhage, at which time her right colon was resected with ultimate recovery. Only diverticula were found on careful examination of the two resected specimens.

M. J., Age 76. Admitted with massive rectal bleeding, and died without operative therapy. Autopsy showed only diverticula on careful search of the entire colon.

E. W., Age 59. Admitted with massive rectal hemorrhage and a diagnosis of diverticulosis made. A left colectomy was carried out and the patient made a good recovery. Careful pathologic study of the excised specimen showed only diverticula.

E. H., Age 66. Admitted weak and dizzy following severe rectal bleeding. A sigmoid colectomy was carried out with recovery. The resected specimen on careful search showed only diverticula.

R. E., Age 81. Patient was admitted with severe rectal bleeding. No blood was obtained by gastric tube and there was *no blood in the stomach, small bowel, ascending or transverse colon* at operation when a colostomy was carried out in the hope that diversion of the fecal stream would cause cessation of hemorrhage. The hemorrhage was so controlled, but recurred from the proximal colostomy loop two days later. A second operation, four days after the first, this time revealed blood in the stomach, and an ulcer on the posterior wall. After gastric resection the pathologist reported this to be an acute gastric ulcer. The patient expired the next day and autopsy was refused.

O. T., Age 69. Admitted confused and dizzy, with a diagnosis of diverticulosis as the source for passage of 1,200 cc. dark fluid blood by rectum. Colon resection was carried out and the patient lived. The resected specimen on careful study showed only diverticula.

G. B., Age 65. Previous admission three years ago with massive bleeding and diverticular disease, hemoglobin of 3.1; responded to conservative therapy. Present admission after three days of tarry stools with weakness and sweatiness. He

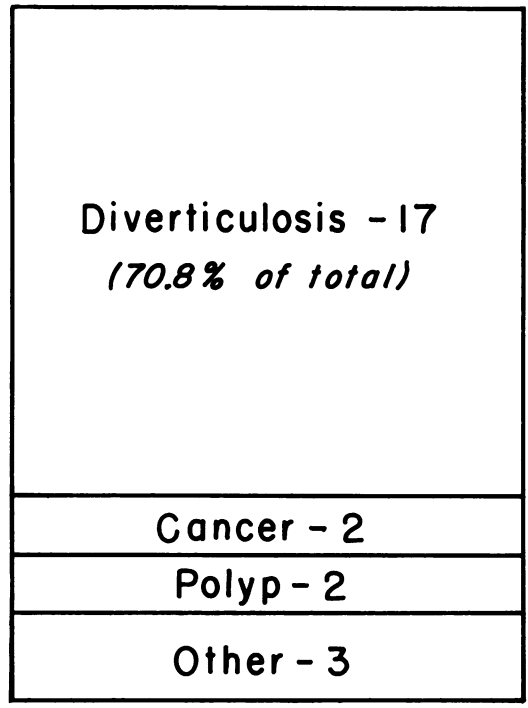

FIG. 4. The proportion of severe bleeding caused by each of the four causes.

required four blood transfusions. Diagnosis was confirmed by the presence of numerous diverticula by barium enema and by the absence of ulcer on G.I. series. He again left the hospital without operation.

G. W., Age 51. Two years previously he was admitted and a diagnosis made of diverticulosis with severe rectal bleeding. Four days before the present admission he again noted tarry stools and frank bleeding by rectum, became weak and dizzy. Barium enema revealed many diverticula throughout the colon. He received eight blood transfusions, after which a total colectomy and ileorectostomy was carried out. No lesions other than diverticula were found in the resected specimen. He made an uneventful recovery.

C. C., Age 80. Episodes of diarrhea and bloody stools for four months. Just prior to admission passed considerable blood by rectum and became dizzy. He required five blood transfusions. Barium enema revealed multiple diverticula, especially in ascending and transverse parts of the colon. He was treated conservatively and discharged. He returned to the hospital some months later and expired after a massive rectal hemorrhage treated by transfusion of re-suspended red cells. Autopsy revealed a blood-filled colon with many diverticula and showing hemorrhagic mucosa. (He also suffered from acute myelocytic leukemia.)

J. G., Age 62. Admitted with history of four massive bloody bowel movements. He continued to bleed uncontrollably from the rectum until colectomy and ileorectostomy were performed. Diagnosis was confirmed by barium studies. The resected specimen showed only diverticula and no other lesions. Recovery.

Polyps

C. L., Age 76. Admitted in shock with the diagnosis made of polyp of the right colon and diverticulosis. A right colectomy was carried out, and the resected specimen showed fresh bleeding from the polyp. The patient recovered.

C. L., Age 41. Admitted with severe bleeding from the rectum, which required massive replacement. A left colectomy was carried out after demonstration of a polyp, which was confirmed in the resected specimen. Patient recovered.

Carcinoma Left Colon

D. C., Age 56. Admitted with severe rectal bleeding, following a previous diagnosis of advanced adenocarcinoma of the rectum with metastasis to the liver. A colostomy brought about cessation of bleeding. Because of the extensive metastasis there was no attempt at resective therapy.

A. D., Age 61. Adenocarcinoma of the sigmoid with perforation and without hemorrhage at the time of colostomy carried out to divert the fecal stream from an abscess at the site of perforation. Ten days later the patient suddenly exsanguinated from his tumor through the colostomy and died of hemorrhage.

Carcinoma of the Right Colon

M. B., Age 68. Admitted with massive bleeding from an adenocarcinoma of the cecum. A right hemicolectomy was carried out and the neoplasm demonstrated in the specimen. Patient recovered and was well 18 months later.

Etiology Undetermined

R. W., Age 65. Admitted following three bright red stools in a six-hour period prior to admission. Fainted during the last one. History revealed that he had also had tarry stools for three months prior to admission. Repeated sigmoidoscopy, barium enema and air contrast studies were unsatisfactory. Patient spontaneously stopped bleeding and was discharged without a definite diagnosis having been achieved.

Leiomyosarcoma Rectum

H. O., Age 59. Admitted with history of two months' passage of bright red blood with defecation and occasional tarry stools, progressive pallor and shortness of breath. There was a palpable mass involving the anterior rectal wall. Palliative abdomino-perineal resection was carried out, removing an anoplastic sarcoma involving the rectum, colon, ovary and fallopian tubes. The patient died.

Discussion

Carcinoma of the colon is again shown to be the most frequent source for rectal bleeding. The data herein presented bear out our clinical impression that this is usually mild or moderate in severity and that exsanguinating hemorrhage from colonic cancer is the exception rather than the rule. When one envisages the abundant finer vascular ramifications on the surface of an ulcerating carcinoma, it is easy to imagine why the bleeding from multiple

eroded smaller vessels should be less severe than that which results from erosion of a major trunk in a polyp or a diverticulum. One cannot over emphasize the importance of considering the possibility of carcinoma as the source for any or all rectal bleeding unless or until this possibility can be excluded and this can often be done only by operative exploration. We are in complete accord with the statements made by Scarborough [41] that one should not unduly procrastinate in his observation of continued or recurrent rectal bleeding on the assumption that it is probably diverticular in origin. The fact that diverticular hemorrhage can be a serious and sudden threat to life, and the frequency of other complications of diverticular disease lend further weight to the argument for elective resection without undue procrastination.

Of major interest in this series is the part played by diverticulosis in producing severe rectal bleeding. In a previous paper before this association one of us (Noer [27]) called attention to colonic diverticular disease as a major source of rectal hemorrhage. Rosser [39] and Rives [36] in discussing that paper expressed the opinion that massive bleeding was more common in diverticulosis than in diverticulitis. Though this difference had not been recognized at the time of our report, re-examination of our data revealed that our experience had, in fact, been the same as that of Rosser and Rives. The patients reported in that series as suffering from massive hemorrhage did, indeed, have diverticulosis with minimal or no evidence of an inflammatory component. The injected and cleared specimens presented with that paper clearly showed the vascular trunks at the diverticular neck whose erosion probably caused the severe hemorrhage.

Despite accumulated experience to the contrary there are still many who deny the frequency of severe diverticular bleeding with a vehemence approaching that of religious fervor. As further evidence we present Figures 5 and 6. Figure 5 is a magnified view of an injected specimen including two colonic diverticula, which clearly demonstrates the large vascular trunks referred to. It is not difficult to envisage the hemorrhage which might be expected from mechanical erosion of these vessels as they enter the diverticular necks. As further evidence, Figure 6 shows a diverticulum, so to speak, in the act of bleeding. This section was obtained from a specimen removed by resection for the treatment of diverticular hemorrhage. It clearly shows the vessel entering the wall of the diverticulum and its erosion near the neck, together with a fresh thrombus lodged at the site of erosion. The mucosa seen to the left reveals the relationship of this eroded vessel to the lining of the diverticulum which it supplied and into which it was bleeding. This, we submit, is indisputable evidence that the hemorrhage in this patient actually had its basis in erosion of a diverticular artery. This, with other reported instances of demonstrable vascular erosion within diverticula, and several reports of actual direct observation of bleeding from diverticular necks, should convince all but the most closed minds that we must accept colonic diverticular disease as a valid source for rectal bleeding.

That polyps can and do bleed severely is well known. Figure 7 demonstrates a polyp removed by resection with a mistaken preoperative diagnosis of diverticular hemorrhage. This particular polyp actually was apparent in barium enema x-ray studies, but this was recognized only when the films were reviewed in retrospect. Neither surgeons nor roentgenologists had previously been willing to make such a diagnosis from the films. Figure 8 shows a cross section of this polyp and demonstrates vividly the erosion of a major vascu-

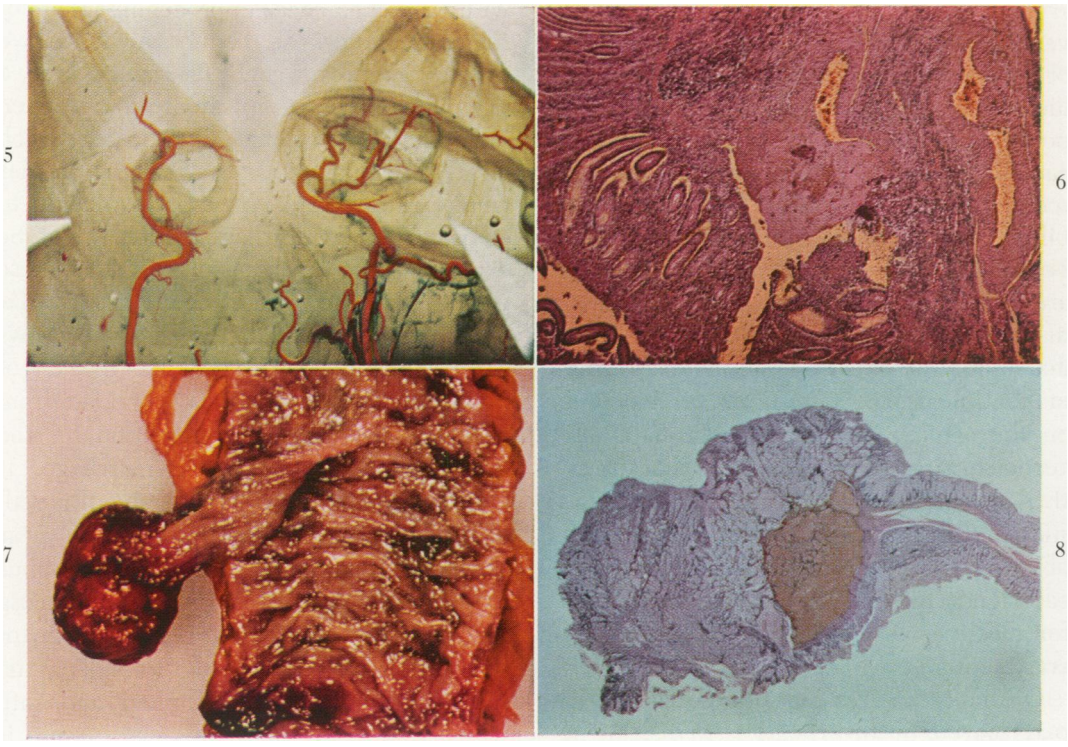

FIG. 5. Injected and cleared specimen of colonic diverticulosis. Note diverticula indicated by the arrows and the vascular trunks supplying each. FIG. 6. Photomicrograph of a section through a bleeding diverticulum. Note relationship of the artery to the neck and lumen of the diverticulum. A fresh thrombus is lodged in the site of arterial erosion. FIG. 7. Colonic polyp in section of colon resected for treatment of massive bleeding. FIG. 8. Photomicrograph of a section through the polyp shown in Figure 7. Note artery entering through the pedicle of the polyp, and hemorrhage at the site of vascular erosion.

lar trunk responsible for the severe hemorrhage.

All of these data emphasize the difficulties encountered in the diagnosis of sources for mild to moderate rectal bleeding and they emphasize the need for thorough study by all available technics. Our emphasis upon diverticular bleeding must not blind us to the possibility of carcinoma, polyps, or other sources, and operative intervention should not be unduly delayed. Exploration during the acute phase of bleeding is at best a difficult and often unrewarding undertaking, fraught with considerable hazard to the patient. Determination of the source of blood which has filled the colon, and often much of the small bowel as well, is a problem taxing the ingenuity of the most experienced surgeon. Our experience with operative coloscopy has been disappointing. A few of our cases in too critical a condition for resection have been treated by colostomy for diversion of the fecal stream as suggested by Foster and Fisher[9] and also by Knight[17] and Chenoweth.[6] A right transverse colostomy, on the basis of probability, might be expected, hopefully, to divert the fecal stream away from the most frequent sites of severe bleeding and perhaps permit more definitive surgery later. It is possible that even with continuing hemorrhage such a colostomy might indicate which half of the colon is bleed-

ing and thus permit a more conservative resection. Our own experience on this point is still too limited to justify any conclusion. Others have suggested the isotopic tagging of red cells in the hope that the pooling of blood within the lumen could be detected with a Geiger counter. All of these suggestions but emphasize the difficulties encountered by the surgeon attempting to find which part of the colon is producing the bleeding which has filled the entire organ and thus obscured its source. Blind subtotal colectomy is of questionable value. There is an urgent need for better technics for identification of the bleeding points masked by a blood-filled colon.

The case summaries include many points of interest. Among the 17 patients bleeding from colonic diverticulosis, material was available for pathologic study following resection or autopsy in 10. Because of our particular interest in this problem, the pathologists have paid particular attention to a search for other sources of rectal bleeding in the specimens submitted to them, but they found none in any of these 10. Some question might be raised with respect to the patient R. E., age 81, for there might be some doubt as to whether the gastric ulcer was perhaps responsible for both episodes of hemorrhage. Absence of blood in the stomach, small bowel, ascending and transverse colon, however, is presumptive evidence that the first hemorrhage had its basis in diverticulosis of the descending colon and cessation of the hemorrhage following colostomy adds weight to this judgment. This patient has been included as an example of diverticular hemorrhage on the assumption that the gastric ulcer which bled subsequently was acute in origin as evidenced by the pathologist's diagnosis. It is our belief that this was a stress ulcer, consequent upon the previous hemorrhage and colostomy. Even if this case is excluded because of this question, there remain 16 cases of severe hemorrhage in which it appears clear that diverticulosis was the basis.

The carcinoma patients are clearly variant from the usual experience. Though there is little doubt that in these three patients the severe bleeding actually had its basis in ulceration of the neoplasm, these exceptions but confirm our opinion that contrary to ideas sometimes expressed, massive bleeding from colonic carcinoma is the exception rather than the rule.

The bleeding from the two polyps was clear-cut and confirmed by histologic studies. We were surprised to find so few cases of severe bleeding from polyps in view of their propensity for this complication.

Summary

1. Among our 245 patients with gross rectal bleeding, cancer of the left colon, diverticulosis, ulcerative colitis, polyp, diverticulitis and cancer of the right colon have been the most frequent sources of hemorrhage.

2. Diverticulosis was responsible for 70.8 per cent of all massive rectal hemorrhage, and approximately one-fourth of all bleeding from diverticulosis was severe in degree.

3. Cancer of the colon was the most frequent source for mild to moderate bleeding, and severe hemorrhage occurred in but three of these cancers, two in the left and one in the right colon.

4. The evidence presented appears to establish that the most frequent cause of severe rectal bleeding is diverticulosis. Carcinoma of the colon remains, in our series as in so many others, the most frequent cause for rectal bleeding; in this lesion, however, the bleeding is nearly always mild to moderate in degree, rarely severe and exsanguinating.

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