Massive Gastro-intestinal Hemorrhage in Jejunal Diverticulosis *

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Introduction

JEJUNAL DIVERTICULOSIS is an uncommon condition. It may gives rise to a variety of surgical complications and disease syndromes of which massive upper gastro-intestinal bleeding is a rare example. Gross and histologically proven ulceration leading to hemorrhage from jejunal diverticula has rarely been reported. It would, therefore, seem worthwhile to present this case in which repeated massive upper gastro-intestinal hemorrhage resulted from such ulceration. This case, in addition, may serve to emphasize the importance of radiologic diagnosis in massive gastro-intestinal bleeding especially in such an oft forgotten area as the small bowel. Repeated massive hemorrhage of uncertain origin should make the surgeon more cognizant of the small bowel as a possible source of massive bleeding.

Review

Reviews on the general subject of jejunal diverticulosis have appeared in the literature.[1-3, 6-9] In the vast majority of cases these diverticula are asymptomatic and are discovered incidentally on gastro-intestinal roentgenograms, during surgical procedures or at necropsy. Surgical complications secondary to jejunal diverticula occurred in 10.4 per cent of 87 clinically diagnosed cases studied by Baskin and Mayo over a nine-year period at the Mayo Clinic.[2] These complications consist of obstruction, hemorrhage, inflammation, perforation, contained foreign bodies, neoplastic involvement and simulation of other gastro-intestinal pathology.[2, 3, 6] In addition dyspepsia and vague abdominal discomfort have been ascribed to these lesions with a disappearance of symptoms following surgical removal.[7] Macrocytic anemia associated with jejunal diverticulosis has recently been described.[5, 11]

Jejunal diverticulosis as a proven source of massive gastro-intestinal hemorrhage is rarely documented in the literature.[4, 10, 12, 13] Berger [4] in 1951 reported two cases with resection, one with massive bleeding but neither case showing ulceration or other mucosal abnormalities. Mayo [10] in his review in 1952 (Berger's cases not included) lists ten previous case reports and adds one of his own where resections (operative 10, necropsy one) had been performed for jejunal diverticulosis as the source of gastro-intestinal bleeding. In only two of these 11 cases were definite ulcerations or bleeding points demonstrated on gross or microscopic examination. Since that time Warthen in 1953 [12] reported massive hemorrhage with jejunal resection but without mention of pathologic proof of ulceration. Waterson in 1954 [13] described a case, but resection was not performed due to the patient's age, obesity, and general condition. In 1956, Jensen [8] reviewed all cases (21) of jejunal diverticulosis seen at the New York Hospital and while gastro-intestinal bleeding of a mild degree was present in some of these cases, none was apparently massive and other demonstrable causes for bleeding were present in all cases.

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Case Report

G. L., a 68-year-old white male clerk, was admitted to University Hospital on the evening of April 26, 1957. He had passed four dark red-black stools during the preceding 48 hours with syncope associated with the latter two bowel movements. In the previous eight hours he vomited twice but neither time was bright red blood or coffee ground material evident. Nausea, flatulence, anorexia and marked weakness were present at the time of admission. No abdominal pain had occurred. There was no previous history of hematemesis, melena, or abdominal complaints of any type. During the past two years, however, the patient had been having two or three loose bowel movements per day. The remainder of the history was not remarkable.

Physical Examination: The patient was well developed and nourished but markedly pale and apprehensive and appeared acutely ill. Vital signs were: rectal temperature 101°, pulse 104, respirations 28 and a blood pressure of 110/58. Warm moist skin, a fetid breath, a slightly enlarged prostate, and grossly bloody red-black stool were the only positive physical findings. The abdominal examination was completely negative.

Laboratory Examination: The red blood count was 1.58 million, hemoglobin 6.6 grams, hematocrit 18 per cent and the white blood count was 14,500 with a slight shift to the left. The urine, bleeding and coagulation studies, fasting blood sugar and serum electrolytes were normal. The blood urea nitrogen was 33 mg. per cent.

Hospital Course: Immediately upon admission an intravenous infusion of physiologic saline solution was started and laboratory studies obtained including a type and cross-match for six units of whole blood. A Foley catheter was inserted and urinary output accurately measured every two hours. A Levin tube was passed into the stomach and placed on constant low suction with a clear colorless gastric juice removed which had free acid but only traces of occult blood. A hemorrhage record, consisting of a running graphic picture of hourly charted blood pressure and pulse together with hemoglobin and hematocrit determinations made every eight hours and the amount of whole blood administered, was utilized to follow his response.

During the first 24 hours, the patient was given three liters of whole blood, two liters of glucose solution and one liter of physiologic saline. Even though he had several more red-black bowel movements on the evening of admission, he had apparently stopped bleeding as evidenced by a fall in pulse rate, rise in blood pressure, hemoglobin and hematocrit and marked clinical improvement. His hemoglobin remained between 10 and 11 Gm. with a 30 per cent hematocrit after replacement therapy.

FIG. 1. Upper gastro-intestinal roentgenogram showing multiple diverticula of the proximal portion of the small bowel.

Roentgenogram Examination: Emergency gastro-intestinal study was done after stabilization, during the second hospital day. In view of the history of bright red rectal bleeding, the colon was examined first by barium enema, which showed a few small isolated diverticula of the pelvic colon without evidence of associated inflammatory changes. Otherwise no pathologic process was demonstrated in the large bowel. The gastroduodenal study with the patient in horizontal position showed normal mucosal pattern of the esophagus, stomach and duodenum without demonstrable bleeding source. There were multiple diverticula, the largest the size of a silver dollar, arising from the proximal jejunal segments (Fig. 1). Although no definite ulcer crater was demonstrated within the diverticula, it was felt by the examiner that this possibility should be assumed by exclusion.

The patient continued to improve except for the rectal temperature varying between 100° and a 103°. He maintained his hemoglobin level and his stools changed to a dark brown but were still guaiac positive. The constant Levin suction was discontinued after 48 hours and the patients was given mineral oil, milk of magnesia, and started on a low roughage diet. A bone marrow examination

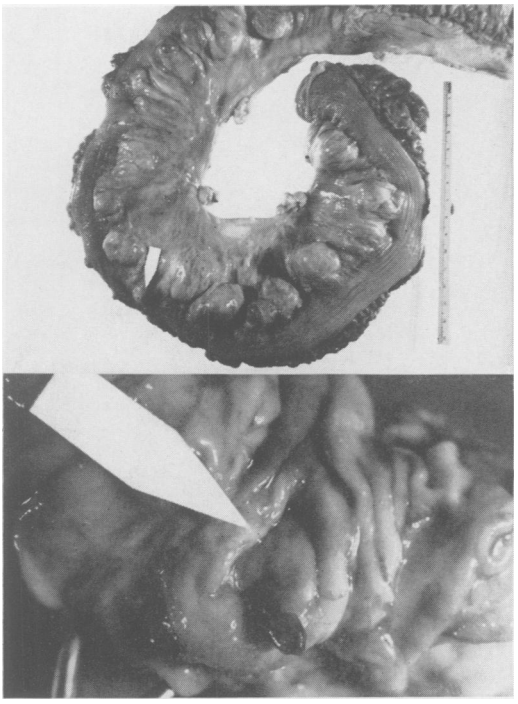

FIG. 2 (Top). Resected portion of the jejunum with multiple diverticula. The arrow shows the smaller diverticulum with ulcer and hemorrhage.

FIG. 3 (Bottom). Mucosal surface of the bleeding diverticulum with firmly attached blood clot. The ulcer has a punched-out appearance and surrounds the bleeding point.

and an electrocardiogram were negative. A 12 hour gastric analysis showed only two mEq. of free acid which was consistent with a negative gastroduodenal roentgenogram for peptic ulcer.

Seventy-two hours after admission the patient became pale and apprehensive rather rapidly with marked diaphoresis. His pulse rose to 100 with a drop in blood pressure to 90/70. This was followed by dark red-black stools as on day of admission. A Levin tube was passed again and placed on continuous suction. Every three hours, two tablespoons of powdered Gelfoam® solution was injected through the Levin tube which was clamped for one hour intervals. During the next 12 hours the patient received 2½ liters of whole blood, two liters of glucose solution and one liter of physiologic saline solution. In view of the second massive hemorrhage and a roentgen diagnosis of jejunal diverticulosis as the most likely source of bleeding, operation was undertaken.

Operation: Through a right paramedian incision, the peritoneal cavity was entered, and multiple loops of blood filled small bowel were noted. The stomach and duodenum were normal and contained no blood. Several inches distal to the ligament of Treitz, multiple blood filled jejunal diverticula were found. The largest diverticulum was proximal, with each succeeding distal diverticulum decreasing in size. On further abdominal exploration no other pathologic lesions were found.

The segment of jejunal (2½′) with diverticula (Fig. 2) was removed and an end-to-end anastomosis accomplished. The portion removed was opened by the pathologist who found a bleeding ulceration in one of the diverticula (Fig. 3). The abdomen was closed in layers and retention sutures utilized. To date the patient has had no further difficulty.

Pathologic Examination: The resected segment of jejunum measured 58 cm. in length and was considerably distended prior to opening the lumen. The wall was edematous and there was no evidence of perforation or peritonitis. The bowel segment contained a large amount of dark red, foamy material as well as partially hemolyzed blood. There were 19 diverticula identified measuring in greatest diameter from 11 mm. to 46 mm. (Fig. 2). All diverticula were located on the mesenteric side of the jejunum and showed a fairly thick wall which was continguous with the wall of the intestine including muscularis mucosae and muscular coat. No concretions were found within the diverticula. In 18 of the diverticula the mucosa was intact. One of the diverticula (arrow in Fig. 2), measuring 18 mm. in diameter, contained at its apex a chronic ulcer with an elastic dark-red clot measuring 6 mm. in length and 3 mm. in diameter attached firmly to the center of the ulcer (Fig. 3). Although careful inspection of the entire specimen was carried out, no other ulcerations or bleeding points were found.

Microscopic Examination: The walls of the diverticula were composed of jejunal mucosa, submucosa, muscularis mucosa, muscularis and serosa. Examination of the histologic sections through the bleeding diverticulum showed a sharply delineated chronic ulcer. In the center of this ulcer was a partially organized blood-clot attached to the ulcer surface which had a thickened fairly large artery beneath. This artery was ruptured at its internal aspect and a continuity of the blood-clot with the arterial lumen was demonstrated (Fig. 4).

Comments

In retrospect, several interesting observations were made from this case. When the patient entered the hospital, the fetid breath typical of upper gastro-intestinal hemorrhage was noted even though no blood

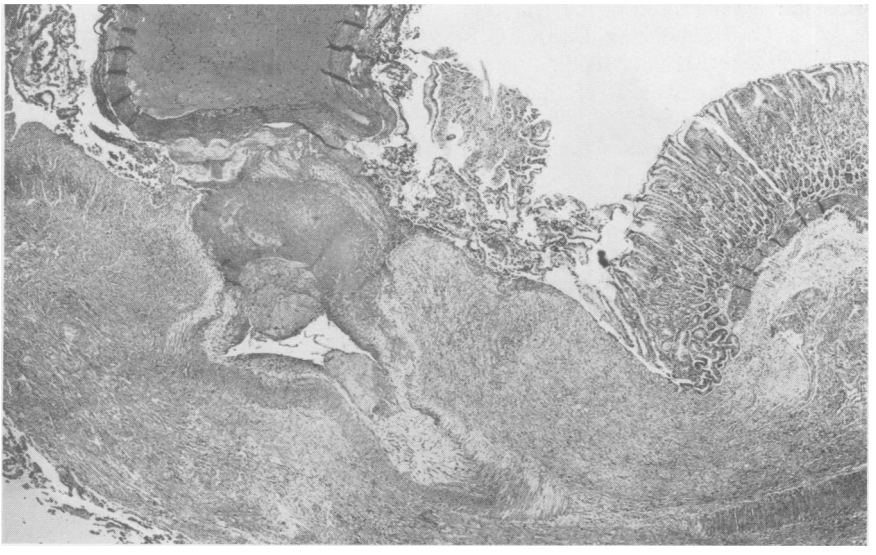

FIG. 4. Microphotograph demonstrates the central portion of the bleeding diverticulum. There is a chronic ulcer, ruptured artery with blood clot, sharply defined edge of intact mucosa as well as necrotic debris on the surface of the ulcer. Note at the extreme right (bottom) the muscularis of the diverticulum as well as at the left a slight focal serosal irritation.

could be aspirated from the stomach. This together with tarry stools should have made us more suspicious that the bleeding was truely upper gastro-intestinal though possibly beyond the ligament of Treitz. Secondly, powdered Gelfoam® was given to the patient, as has been previously described,[14] and at the time the specimen was opened the pathologist noted, "a large amount of dark-red foamy material as well as hemolyzed blood in the small bowel lumen and diverticula." The clot may be noted in Figures 3 and 4 which would indicate bleeding had again ceased at the time of operation possibly as a result of the Gelfoam®. Thirdly, small bowel diverticula are divided into two types.[1, 3, 7] True or congenital diverticula characteristically occur on the antimesenteric side of the bowel and consist of all the layers of the small bowel. False or acquired diverticula generally arise in the mesenteric portion of the small bowel and consist only of the mucosa and submucosa layers of the bowel wall. The jejunal diverticula in the case presented arose from the mesenteric side but consisted of all layers of the jejunal wall.

Summary

A review of the literature, a case report, comments and a complete pathologic confirmation of massive gastro-intestinal hemorrhage from an ulcerated jejunal diverticulum are presented.

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Book Reviews (Continued from page 858)

THE BIOLOGIC BASIS OF CANCER MANAGEMENT: FUNDAMENTAL RESEARCH, EXPERIMENTAL BIOLOGY, DIAGNOSIS, TREATMENT, PREVENTION. By Freddy Homburger, M.D., New York, Hoeber-Harper, 1957, 354 pages, $10.00.

The author surveys the field of cancer from the basic biologic viewpoint. Both experimental and chemcial aspects are included. The roles of environment, heredity, viruses, and hormones are assessed in brief. There are short chapters on host and tumor interrelations, the chemistry of tumors, and the natural behavior of cancers. The diagnosis, pathology, surgery, radiotherapy and chemotherapy of cancer are reviewed very briefly in separate chapters.

Medical students and practitioners may find this book useful as an introduction to the study of cancer, particularly with regard to the biologic approach.

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SURGERY OF THE CHEST. By Julian Johnson, M.D., Sc.(Med.), and Charles K. Kirby, M.D., 2nd Ed., Chicago, Year Book Publishers, 1958, 398 pages, $9.75.

The second edition of this familiar atlas of chest surgical operations incorporates essentially new chapters on hypothermia and open heart surgery. Revisions of the previously described technics are minor, which attests the reliability and general acceptance of the methods advocated by the authors.

The book is ably illustrated. The text is easy to read and includes not only directions on technic but in many instances comments on postoperative care and complications. The book is not a treatise on thoracic disease, anatomy, or physiology, and as such, conforms with its purpose as a handbook of technics for the occasional but competent chest surgeon and the trainee in thoracic surgery.

As in the first edition, there is no bibliography. The binding and arrangement of the book remain good. The current purchase price is high considering the intent of the book and the availability of other works on technic.

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MILESTONES IN MODERN SURGERY. Edited by Alfred Hurwitz, M.D., and George A. Degenshein, M.D., New York, Paul B. Hoeber, 1958, 520 pages, $15.00.

This book is a collection of original papers presenting many of the advances in general surgery during the past 100 years. Related articles are arranged chronologically and cover a variety of subjects including vascular and thoracic surgery, wound healing, fluid balance, cancer and intestinal obstruction by many well known authors. Each grouping is prefaced by the editors with some remarks which lend a continuity to the presentation.

Some of the articles are primarily of historical interest, but the great majority are informative as well, and make profitable and enjoyable reading. The book is attractively presented, indexed, and well illustrated with charts, photographs and sketches from the original papers. A short biographical sketch and picture of the author precede each contribution. This book makes a very worthwhile addition to the library of any surgeon, and should be of especial interest to the surgical resident and medical student entering his clinical years.

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