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PROBLEMS IN THE MANAGEMENT OF MASSIVE BLEEDING FROM THE GASTRO-INTESTINAL TRACT*

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THE MAJOR portion of the recent voluminous literature on massive bleeding from the gastro-intestinal tract has dealt with bleeding from the lower esophagus or stomach, while massive bleeding from other sites has received only scant attention. It is the purpose of this paper to present certain problems which we have encountered in massive gastro-intestinal hemorrhage, with particular reference to cases in which bleeding was not due to peptic ulceration or esophageal varices.

There is at present rather general agreement, among surgeons at least, as to the management of massive bleeding from peptic ulceration of the duodenum or stomach. Numerous reported series^{6, 7} have unequivocally demonstrated a higher salvage rate in those cases where rapid blood volume replacement and early surgery in the form of subtotal gastrectomy has been carried out. A physiological basis for the more satisfactory results obtained by emergency surgery and the obtainment of hemostasis as rapidly as possible has been indicated in recent experiments which showed that massive arterial bleeding from the stomach or duodenum reduces the blood flow through the hepatic artery se-

lectively.³ Since hepatic hypoxia has been incriminated by some investigators as the fundamental cause of surgical shock, the implications are evident.

On the other hand, with signs and symptoms of cirrhosis of the liver and bleeding from esophageal varices, there is, in general, agreement that tamponade with a Patton-Johnston or Saengstaken type tube is the emergency treatment of choice. Tamponade is also useful as a diagnostic method in determining the site of hemorrhage when the etiology is obscure. Continued use of tamponade is not without danger of respiratory complications, but this has not occurred in our limited experience. Careful attendance to aspiration of the stomach and pharynx is mandatory.

The real difficulty in the management of the patient with upper massive gastro-intestinal hemorrhage presents itself in those cases in which neither of the above stated causes is apparent, or one of the infrequent causes is present. Among the latter are two conditions which deserve more attention than they have received.

Massive bleeding may occasionally occur from esophageal hiatus hernia.

CASE REPORTS

Case 1. (Chart #178088) A 52-year-old female was admitted to the service of Dr. H. L. Bockus with a history of 3 episodes of severe hematemesis. Thorough studies were negative ex-

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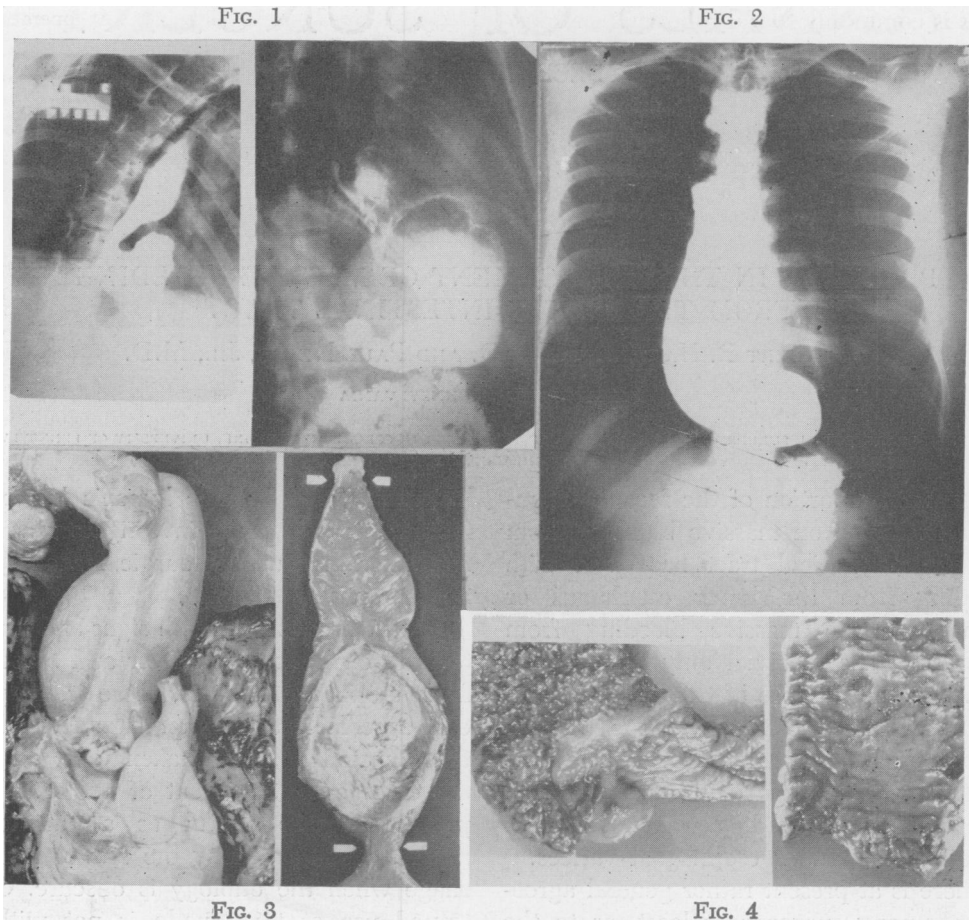


FIG. 1. Roentgenograms showing large esophageal hiatus hernia in a female having recurrent bouts of gastro-intestinal bleeding.

FIG. 2. Roentgenogram showing achalasia of esophagus in patient having massive recurrent bouts of gastro-intestinal hemorrhage following esophagogastrostomy of Grondahl-Womach type.

FIG. 3. Esophagus at necropsy. Note the large fungating lesion in the hugely dilated esophagus. Roentgen examination was essentially negative.

FIG. 4. Resected segments of colon from 14-year-old male with severe bleeding from ulcerative colitis. Specimen on left reveals essentially normal ileum and severely involved cecum and ascending colon. Specimen on right shows a segment of sigmoid removed at the second operation. Despite the fact that only a segment of large bowel of 12 to 16 cm. remained in this patient, he nonetheless continued to exsanguinate from the short remaining segment.

cept for the presence of a large esophageal hiatus hernia (Fig. 1). While in the process of preparing her for operation, massive gastro-intestinal bleeding occurred. Following the rapid administration of 3000 ml. of blood, operation was carried out. Thorough examination was completely negative except for the presence of the hiatus hernia. There was no gross evidence of ulceration within the herniated portion of the stomach. The hiatus hernia was repaired and recovery was uneventful. No further bleeding has occurred since operation 5 years ago.

Another troublesome source of upper gastro-intestinal hemorrhage has been that which has occurred in patients subjected to cardioplasty or esophagogastrostomy. There is ample evidence⁵ that whenever the esophago-gastric junction is destroyed, repeated regurgitation of gastric juice into the esophagus almost invariably occurs. As a result of this regurgitation, inflammation, ulceration and scarring of the lower esoph-

agus is commonly found following such operations. In our experience, hemorrhage also has been a troublesome complication. While we have thus far had no hemorrhages in the patients having esophagogastrostomy for carcinoma, it has been quite a

servative management (Fig. 2). At operation a Grondahl-Womach type procedure was performed. On the tenth postoperative day, a massive hemorrhage occurred. In the following 2 weeks she had 3 other episodes of profuse bleeding, manifested by hematemesis and melena, each responding to massive transfusion. It was assumed

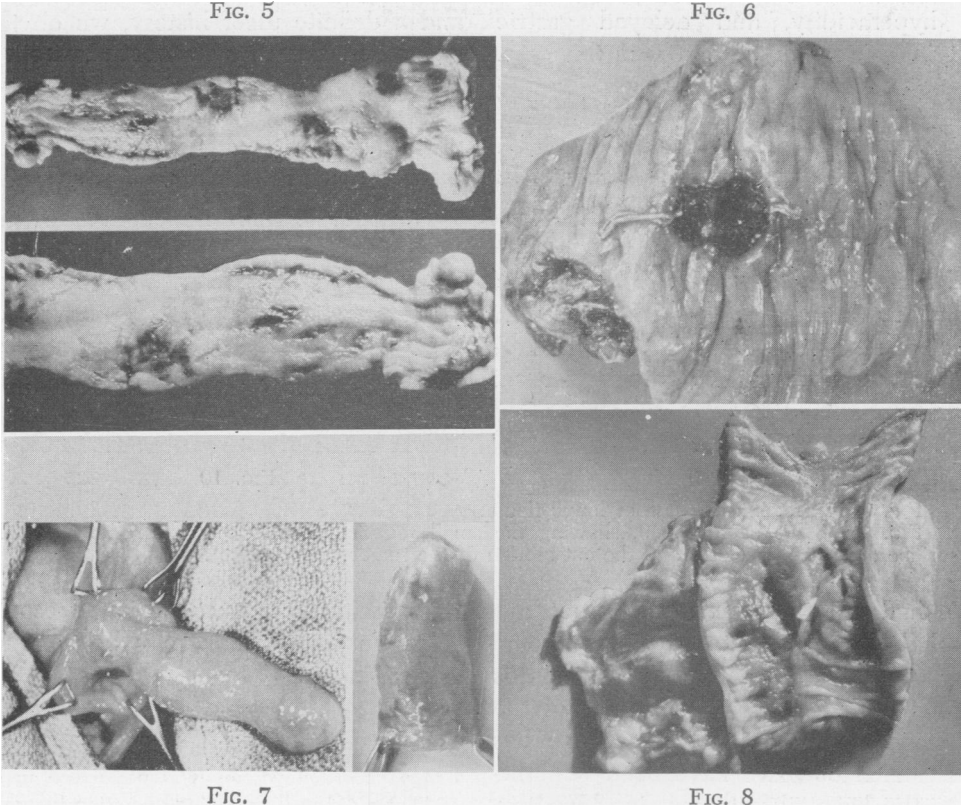


FIG. 5. Resected specimen of rectum and sigmoid from patient with ulcerative colitis in whom an emergency abdomino-perineal procedure was carried out for massive bleeding. Note the large, ulcerated, bleeding areas.

FIG. 6. Resected segment of colon containing the previous polypectomy site. The bleeding was coming from the slough at the site of excision of the polyp.

FIG. 7. Submucous cystadenoma of the duodenum.

FIG. 8. Resected specimen revealing neurofibrosarcoma ulcerating into the duodenum. Note the large communication between the tumor and the duodenum. The arrow is pointing to the ampulla of Vater which lies in close relationship to the eroded area.

problem in those patients having various plastic procedures for achalasia. It is well to point out that despite vagotomy incident to esophagogastrostomy, ulceration in the lower esophagus will also occur, although the gastric acidity has been decreased.⁵

Case 2. (Chart #180788) A 44-year-old female was admitted to the service of Dr. Gabriel Tucker with severe achalasia intractable to con-

that the bleeding was from peptic ulceration of the lower end of the esophagus, and conservative management was continued. She returned to her home in Florida, and following another episode of bleeding and poor esophageal emptying, she was re-operated upon.¹ The esophago-gastric junction was almost obliterated with scarring and fibrosis. Longitudinal division and closure transversely was accomplished at the cardio-esophageal junction. Bleeding episodes continued and roentgen examination one year postoperatively revealed delayed

emptying and evidence of a duodenal ulcer, with scarring and fibrosis. At operation, however, the pyloroduodenal area was negative to palpation. A gastroenterostomy was performed and the patient has had no further bleeding in 4 years.

The difficulties attendant upon alteration of the esophago-gastric junction mechanism, hyperacidity, and delayed gastric emptying are readily apparent in this case.

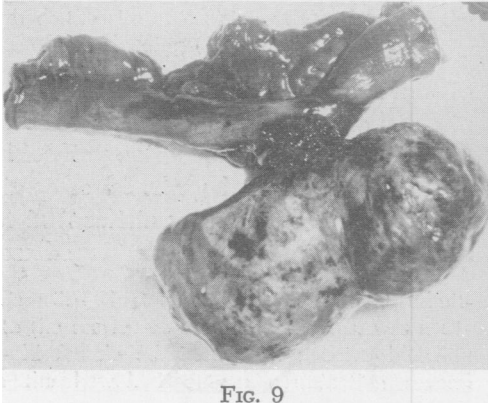


FIG. 9

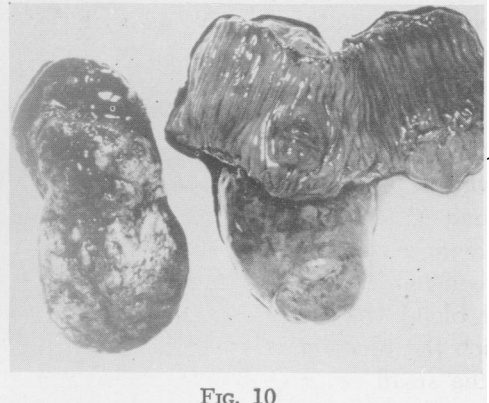


FIG. 10

FIG. 9. Neurogenic fibroma of lower ileum.

FIG. 10. Same as Figure 9, showing the small rounded ulcerated area on the mucosal surface of the ileum (left) and the cut section of the tumor mass (right).

We had felt that the Heller procedure for achalasia had obviated the troublesome complication of hemorrhage. While this may actually prove to be the case, of the 23 patients on whom this procedure has been carried out, two have been readmitted to the hospital with massive bleeding.

Case 3. (Chart #183709) A 61-year-old male had an esophagocardiomyotomy performed for achalasia in May, 1949. He was readmitted one year later with severe hematemesis, and although roentgenograms were negative, it was felt that he was bleeding from a duodenal ulcer, and he responded to medical treatment. Esophagoscopy on this occasion was essentially negative. He was readmitted to the hospital 7 months later with massive bleeding. Red blood count was 3 million and hemoglobin 9 Gm. He responded to 2000 ml. of blood and the profuse bleeding ceased. Roentgen studies soon thereafter revealed an area of ulceration in the lower esophagus. Since this was felt to be an ulceration secondary to regurgitation of gastric juice, he was treated conservatively for 2 weeks and repeated roentgen studies revealed almost complete healing of the ulcerated area. An esophagoscopic examination was done at this time,

only, in these markedly dilated esophagi, roentgen examination may be completely misleading.

Case 4. (Chart #200911) A 61-year-old male was known to have severe achalasia for 10 years. Esophagocardiomyotomy was performed in April, 1949. He did well following operation for some 10 months, at which time he was readmitted with massive melena and a blood count of less than 2 million red blood cells. Exhaustive studies, including a gastro-intestinal series and esophagoscopy, were essentially negative except for poor gastric emptying and a questionable filling defect in the cardia. He was explored and nothing was found. The stomach and duodenum were entirely negative. He got along well after operation until 6 months later when he again had really massive melena. Again esophagoscopy was essentially negative except for moderate inflammation in the lower portion. Barium studies revealed some delay in gastric emptying, but no other abnormalities. The string test indicated bleeding at the lower esophagus. Feeling that the delayed gastric emptying was aggravating the regurgitation, it was elected to perform a subtotal gastrectomy. At operation, the stomach and duodenum revealed no

significant pathologic condition. There was no evidence of ulceration or scarring of the duodenum. A subtotal gastrectomy was performed and his convalescence was uneventful. Follow-up examination 8 months after operation revealed the patient to have gained 20 pounds, and to be completely symptom free.²

Here again, it is reasonable to assume that obstruction at the gastric outlet and destruction of the esophago-gastric junction mechanism resulted in acid regurgitation, esophagitis and hemorrhage.

Massive bleeding from the remainder of the gastro-intestinal tract, that is from the second and third portions of the duodenum downward, is manifested by melena. In around 90 to 95 per cent of cases presenting with massive melena, the bleeding can be controlled with a conservative regimen and blood transfusion. In those cases in which the bleeding is from known lesions of the small or large bowel, there is not ordinarily much problem in management other than transfusing the patient and carrying out whatever procedure may be indicated at the optimum time. Even in those cases, however, where the source of bleeding was known, we have been at times confronted with serious problems. This has been particularly true in patients with ulcerative colitis.

Case 5. (Chart #206067) This 14-year-old, extremely emaciated white male, admitted to the service of Dr. H. L. Bockus, with known ulcerative colitis, required a subtotal colectomy as an emergency procedure for massive hemorrhage (Fig. 4). Forty-eight hours after operation, he began to bleed profusely from the remaining sigmoid and rectum. Despite massive transfusions, he repeatedly exsanguinated. On the 13th postoperative day, he was again operated upon and the remaining sigmoid was removed down to the pelvic floor (Fig. 4). The procedure was terminated at this point, since it was felt that death would occur on the operating table if the procedure was further prolonged by removal of the rectum. He continued to bleed from the rectum, however, and died 9 days after the second operation. Perhaps a more heroic attitude when he first began to bleed following the subtotal colectomy would have resulted in the salvage of this patient.

Case 6. (Chart #209637) This 34-year-old white female, admitted to the service of Dr. H. L. Bockus, with known ulcerative colitis, was admitted to the hospital for elective subtotal colectomy. Operation was carried out uneventfully and convalescence was smooth. On the 14th postoperative day, she had a moderate hemorrhage from the rectum which ceased following blood transfusion. Seven days later, in the middle of the night, she had an exsanguinating hemorrhage from the



FIG. 11. Leiomyoma of the jejunum with fatal intestinal hemorrhage.

rectum. Blood transfusions were rapidly administered through both arms, and an emergency abdomino-perineal resection was performed. Recovery was uneventful (Fig. 5).

When excessive bleeding has occurred in a patient with this disease, it is now our policy to complete the operation in one stage, but this is only done when every factor of safety is considered. Otherwise, if a patient has any appreciable bleeding from the remaining segment following subtotal colectomy, the final stage is completed as soon as conditions permit.

Case 7. (Chart #198552) A 44-year-old obese male patient was admitted to the service of Dr. H. J. Tumen with rectal bleeding. Roentgen examination revealed the presence of a pedunculated polyp in the mid sigmoid. In April, 1950, laparotomy was performed and the sigmoid polyp was removed. Abdominal exploration was otherwise essentially negative. No other polyps could be palpated in the colon. His convalescence was smooth until the sixth postoperative day, when he had a massive pulmonary embolus. Heparin and dicoumarol were immediately instituted, and although he was markedly resistant to both, adequate prolongation of clotting time and of prothrombin

time was obtained. Four days later he had massive melena. Although he received 8000 ml. of whole blood over the following 96 hours, bleeding continued. Laparotomy was again performed. It was rapidly apparent that the source of bleeding was at the site of the polypectomy since the bowel was free of blood above this point, and filled with blood below the area. A segment of colon containing the previous polypectomy site was resected and intestinal continuity restored. Examination of the resected specimen revealed a slough at the site of excision of the polyp as the source of the bleeding (Fig. 6).

In a reasonable number of patients in which the diagnosis was unknown prior to the bleeding episode, roentgen examination during the bleeding has been helpful, at least in localizing a possible source of the hemorrhage.

Case 8. (Chart #205084) The patient, admitted to the service of Dr. H. L. Bockus, was a 61-year-old female admitted with massive bleeding from the bowel. Roentgen examination several days after blood replacement, but while the patient was still having melena, revealed a filling defect in the second portion of the duodenum. Following administration of 1500 ml. of blood, operation was carried out. In the duodenum at the site disclosed by roentgenogram was a long, tube-like structure about 7.5 cm. by 2 cm., covered with normal appearing mucosa except at the very tip. Here the surface was granular, flattened, and contained three tiny slits which discharged a mucohemorrhagic substance upon slight pressure. The specimen proved to be a submucous cystadenoma originating from the deep mucous duodenal glands (Fig. 7).

Case 9. (Chart #209859) A 34-year-old male had received 13 whole blood transfusions for massive melena while in a hospital in Venezuela, and when it was felt that his condition was sufficiently stabilized, he was flown to this country. On admission to the hospital, the patient showed evidence of continued blood loss with hypotension, rapid thready pulse, and hemoglobin of 9.0 Gm. with 3.3 million red blood cells. One liter of blood was rapidly administered with considerable improvement of the vital signs. Approximately 16 hours after admission, while still having melena, barium swallow was carried out. The studies revealed evidence of extrinsic pressure on the duodenum, interpreted as probably due to malignancy. Transfusions were continued and operation was performed approximately 30 hours after admis-

sion. The duodenal loop was widely separated as the result of a large, oval, bluish-black tumor bulging out from behind the head of the pancreas. The mass measured about 9 cm. across and 12.5 cm. in length. It was tensely distended with fluid. Anteriorly it was intimately adherent to the duodenum and head and body of the pancreas. During dissection, the soft mass disintegrated as a soft jelly substance and bled profusely. After disintegration, the tumor mass could be felt to communicate with the duodenum through a large ovoid opening on its posterior wall. Hemorrhage was extremely difficult to control. The second and third portions of the duodenum and the tumor were rapidly excised, and duodenojejunostomy and cholecystjejunostomy was carried out. The pancreatic duct was ligated. In the postoperative period, he developed a pancreatic fistula and on the 20th postoperative day, he had a sudden exsanguinating hematemesis. He was rapidly transfused and again operated upon. The source of the bleeding was from an eroded pancreatico-duodenal artery and from two anomalous arteries in the extremely vascular bed from which the tumor had been removed. The duodeno-jejunal anastomotic line was also eroded, and bleeding into the bowel occurred at this point. The bleeding was controlled, but since the large erosion into the anastomotic line was irreparable, the only course left open was to perform a partial gastrectomy and gastroenterostomy. His condition remained poor, however, and he died 72 hours after operation. Pathologic diagnosis of the resected tumor was neurofibrosarcoma (Fig. 8).

During both operative procedures, the extreme vascularity of the pathologic process was exceedingly difficult to handle. If a total pancreatectomy had been performed at the original operation, it is probable that the erosions into gastrointestinal tract and into vessels might have been avoided, thereby averting the fatal sequela.

In some 15 to 20 per cent of patients presenting with massive bleeding *per rectum*, no diagnosis will be forthcoming, even after the most exhaustive survey. This has been a most difficult group with which to deal. We are reluctant to advise exploratory laparotomy during a quiescent phase, since this is almost invariably nonproductive. Our policy in this group of cases has been

to insist that the patient stay near a large medical center at all times with all studies at hand. They are advised to enter the hospital at once for immediate operation should bleeding again occur. We make every effort to operate as soon as possible; after, of course, instituting the usual supportive therapy. In some cases handled in this manner, the cause of the bleeding has been quite readily found at operation.

Case 10. (Chart #177968) This 64-year-old white female had a severe bout of melena 3 months prior to the present admission. Complete blood studies, barium studies, proctoscopy and esophagoscopy were essentially negative except for the presence of a hiatal hernia. She was readmitted following a severe hemorrhage, with a hemoglobin of 51 per cent. Transfusions were administered and exploration was carried out. At operation, the following were found to be present: (1) A moderately large hiatus hernia, (2) A jejunal diverticulum measuring 2 cm. in diameter and 1.5 cm. deep, situated 30 cm. from the Ligament of Treitz, and (3) A large pedunculated tumor on the antimesenteric border of the ileum, 5½ feet from the ileocecal valve. The tumor had a one-inch pedicle and was about the size and shape of a kidney. Blood was present in the intestine distal to this point. The mass was removed, along with 4 inches of ileum on either side. At its attachment to the ileum, the mucosa of the ileum was elevated, rounded and nodular for an area of 2 cm. On cut section, the tumor revealed many cyst-like areas filled with blood, and the pathologic diagnosis was neurogenic fibroma (Figs. 9 and 10).

This case strikingly demonstrates the advantage of operation during a bleeding episode. Theoretically, bleeding could have occurred from any one of the three lesions. Had she been operated upon during a quiescent period, it would have been impossible to tell which one was responsible. Within the past year, we have operated upon, during a bleeding phase, two patients with recurrent bouts of massive melena, to find the source of the bleeding to be a Meckel's diverticulum. In both instances, exhaustive studies had failed to reveal any source for the bleeding.

Case 11. (Chart #207348) The patient was a 60-year-old male, admitted to the gastro-intestinal

service of Dr. H. L. Bockus in his eighth bout of massive melena. He had been studied intensively in 2 of the larger clinics in this country, but no source for the bleeding was found. Six months prior to the present hospitalization he was explored during a quiescent phase elsewhere. At that time, a Meckel's diverticulum was found and removed, and it was thought that the bleeding point had been eradicated. He began to have massive melena again 72 hours prior to his admission to the Graduate Hospital of the University of Pennsylvania, in September, 1951. Transfusions were immediately instituted, his vital signs stabilized, and the bleeding ceased. For the third time, he was again exhaustively surveyed with negative results. He was advised to return to the hospital for immediate operation if bleeding should again occur. It was hoped that this would facilitate the location of the area of bleeding. Two months later he began passing a small amount of blood, but for some reason, did not enter the hospital until 60 hours later, after he began passing bright blood and clots from the bowel. Immediate preparation and exploration revealed the presence of a large amount of blood in the colon and a moderate amount in the terminal ileum. A complete exploration was made with negative results. Needle aspiration of a small amount of material from the upper jejunum yielded a strongly positive guaiac test. On re-examination of the pylorus, a small indurated nodule was palpable. The stomach was opened and further examination was non-revealing. It was felt that the nodule might represent a leiomyoma or a tiny ulcer and, therefore, the duodenum was transected and a subtotal gastrectomy was performed. The pylorus was spread open and inspected and a very small but definite ulcer was found. It was then felt that the bleeding point most surely had been found. The patient returned to his home in Florida but has since had melena, and on one occasion required a transfusion of 1000 cc. of blood.

This case readily reveals the difficulty that is sometimes encountered in massive bleeding. Despite two thorough explorations and the removal of two potential sources of bleeding, the Meckel's diverticulum and the pyloric ulcer, the source was not found and the patient has continued to bleed. Obviously, a small lesion has been overlooked.

That one may encounter an insurmountable difficulty as to the location of the point of hemorrhage may be demonstrated

by a patient who was seen in consultation by the senior author. This case was previously reported in detail.⁴

Case 12. The patient was a 29-year-old female, admitted to the hospital with massive bleeding *per rectum* of 72 hours duration. She had been in excellent health prior to admission. Blood transfusions were rapidly administered, but the bleeding was so excessive that she could not be stabilized and it was decided to operate upon her.* The ileum was distended with blood; however, no organic lesion or point of hemorrhage could be demonstrated throughout the entire length of the bowel despite the most careful search, and the abdomen was closed. Although 28 pints of blood were administered postoperatively in an effort to control the bleeding, she nonetheless continued to bleed and died 36 hours postoperatively.

Necropsy revealed massive fresh hemorrhage and blood clot within the lumen of the small intestine extending from the lower jejunum throughout the ileum and colon. In the jejunum, on the mucosal surface, there was a small tumor measuring 0.5 cm. in diameter and having the consistency of a maraschino cherry. Microscopic examination revealed this to be a congenital aneurysm of the jejunum, with rupture into the lumen.

That the reverse of this experience could well have occurred is illustrated by a final case.

Case 13. (Chart #152896) A 56-year-old white male, was admitted to the hospital in March, 1944, in his 20th episode of severe bleeding. He was known to have a duodenal ulcer and a gastro-jejunoscopy had been performed elsewhere some 11 years prior to his present admission. His bleeding was thought to be from the ulcer during some of the earlier episodes, and he had subsequently undergone exhaustive study without any other cause being found. Despite massive transfusions, he continued to bleed severely, suddenly passed 3 huge, bloody stools, and died 60 hours after admission. Necropsy showed dense scarring at the pyloroduodenal junction with obliteration of the lumen. Twenty centimeters from the gastrojejunostomy, a firm nodulated mass about 2.5 cm. in diameter was discovered in the wall of the jejunum. One third of the tumor extended into the

lumen. The bleeding originated at this point. The tumor proved to be a leiomyoma of the jejunum (Fig. 11).

This occurred eight years ago while an attempt at diagnosis was still being made by the gastroenterologists. The policy of immediate preparation and exploration at the first sign of recurrence of the bleeding, as practiced since then, would probably have resulted in salvage of this patient.

SUMMARY AND CONCLUSIONS

The cases which we have presented are admittedly rare and are important *per se* only in so far as they have served to illustrate the various problems which we have encountered in the severe bleeder and the manner in which we now manage these cases.

We are in full agreement with emergency gastrectomy in those patients having massive, uncontrollable bleeding on the basis of gastro-duodenal lesions which are amenable to this type of procedure—namely, peptic ulcer, and benign and malignant tumors. However, we feel that a word of caution should be sounded against over application of this principle to the extent that gastrectomy is performed although no lesion is found at the time of exploration. In our experience, lesions amenable to this type of surgery constitute only around 75 per cent of the total patients having massive upper intestinal bleeding manifested by hematemesis.

Lastly, we have felt that in patients having massive melena, in whom there is no demonstrable cause after thorough study, operation should be carried out during a bleeding episode. Not only will this allow fairly accurate localization of the bleeding, but also in those cases where more than one potential source may be present, the correct one may be discovered.

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