GASTRO-INTESTINAL BLEEDING IN INFANTS AND CHILDREN[1]

ROBERTO ORTIZ, M.D.,[2] THOMAS G. BAFFES, M.D.[3]
and
WILLIS J. POTTS, M.D.

THE occurrence of blood in the stool or vomitus of a child is alarming to both parent and pediatrician. However, the etiology of gastro-intestinal bleeding in children is often difficult to establish. In many cases of mild bleeding, extensive workup, including proctoscopic examination and radiologic visualization of the entire bowel, fails to reveal the source of bleeding. Ordinarily, the bleeding ceases spontaneously and does not recur. When gastro-intestinal bleeding is more severe, it is frequently associated with other signs and symptoms that help make a correct diagnosis. Sometimes, when it is unaccompanied by other signs and symptoms, the diagnosis may require extensive effort. A differential diagnosis is absolutely essential, however, since the underlying cause may be amenable to careful medical management or prompt surgical correction.

In order to provide added insight into rectal bleeding and hematemesis in infants and children, all the cases with gastro-intestinal hemorrhage as a primary or secondary symptom admitted to The Children's Memorial Hospital from January 1, 1948 through December 31, 1952 were assembled. They may be summarized as follows:

Etiology of G.I. Bleeding in Infants and Children

A. *Rectal Bleeding* (202 Cases—89.3%)
- Intussusception 48
- Meckel's Diverticulum 22
- Polyps 15
- Bleeding of Undetermined Origin 26
- Entero-colitis (diarrhea) 32
- Anal Fissure 24
- Fistula in Ano 5
- Proctitis 11
- Rectal Prolapse 7
- Ulcerative Colitis 6
- Hemorrhoids 2
- Duodenal Ulcer 2
- Biliary Atresia 1
- Hemophilia (Laceration) 1

B. *Oral Bleeding* (24 Cases—10.7%)
- Purpura (Thrombocytopenic) ..9
- Banti's Syndrome 3
- Hemophilia (Laceration) 5
- Hemorrhagic Disease of Newborn 2
- Duodenal Ulcer 2
- Cirrhosis of the Liver 1
- Curling's Ulcer (Stomach: post burn) 1
- Pharyngitis 1

From this tabulation, it is apparent that there may be numerous causes of gastro-intestinal hemorrhage. The major types will be discussed and representative cases will be presented.

Rectal Bleeding

Intussusception: During the five-year period included in this study, 53 cases of intussusception were encountered. Five cases did not have associated rectal bleeding. Three cases had some detectable cause for the intussusception; two had Meckel's diverticulum and one had polyps. The remaining 50 cases were classical. They had no apparent cause for the intussusception.

[1]From the Department of Pediatrics, Northwestern University Medical School. Received for publication, October 2, 1953.

[2]Surgical Fellow supported by the Florence Olmstead Memorial Fellowship of the Women's Faculty Club of Northwestern University and the W. K. Kellogg Foundation.

[3]From the Otho S. A. Sprague Memorial Institute Laboratory of the Children's Memorial Hospital.

Forty-eight cases had rectal bleeding. The bleeding was fairly characteristic. There was, of course, the typical history of sudden onset of abdominal colic in an apparently healthy male child, followed by recrudescent and recurrent episodes associated with vomiting and a palpable doughy abdominal mass. Bleeding from the rectum was moderate and consisted of "currant-jelly" to bright red blood. Digital examination frequently disclosed a palpable cervix-like mass in the rectum.

The rectal bleeding, in most cases of intussusception, occurred immediately following the onset of symptoms and was moderate in amount. In the rare case, the bleeding might be quite severe, the patient showing signs of shock. In a few cases, the onset of bleeding was delayed for many hours or days, so that it was not part of the initial syndrome. In most cases, however, the diagnosis was definite. A confirmatory barium enema did not have to be done. The treatment of choice was exploratory laparotomy with manual reduction of the intussusception.

Three cases are presented—one is a typical case. The second case represents recurrent intussusception associated with multiple polyps and characteristic pigmentation of the lips and tongue. The third case illustrates some of the difficulties in diagnosing intussusception in its more indefinite forms.

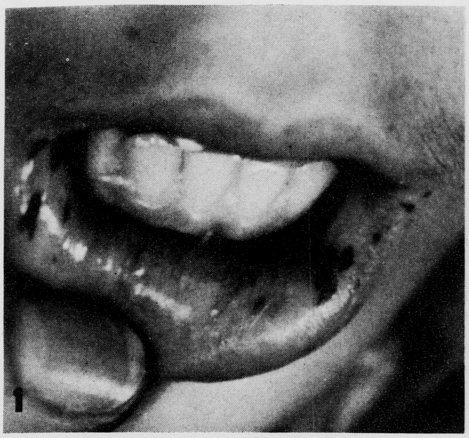
Case Reports

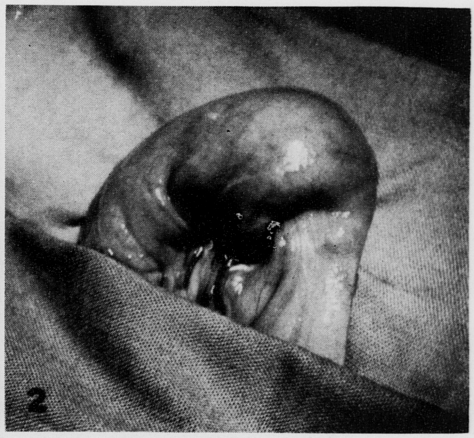
Case 1, G.W. This 2½-year-old boy was admitted to The Children's Memorial Hospital on June 24, 1950 with a history of abdominal cramps, loss of appetite and occasional vomiting for 5 days before admission. For 3 days before admission, the patient had been constipated. The day before admission, the abdominal cramps became more severe and more frequent, lasting about one to two minutes and occurring at intervals of one hour. On the day of admission, a small amount of mucus and dark red blood passed from the rectum. Physical examination revealed a well-developed, well-nourished child who did not appear acutely ill. There was no diffuse tenderness or rigidity of the abdomen. There was a palpable mass in the right upper abdominal quadrant measuring about 2 cm. in diameter. Hyperactive peristalsis was heard on auscultation of the abdomen. Rectal examination was not remarkable. A diagnosis of intussusception was made. The patient was operated upon the day of admission and an ileo-colic intussusception was found. This was easily reduced and the patient had an uneventful postoperative convalescence. He was discharged on the fourth postoperative day.

Case 2, C.C. This 9-year-old girl was admitted to The Children's Memorial Hospital with a history of intermittent, recurrent, cramping abdominal pain for about one year prior to admission. On the day of admission, she had a sudden pain involving the left flank and left costovertebral region, as well as the left upper and lower abdominal quadrants. An enema was administered but it was non-productive. On physical examination there was a movable, rubbery mass in the left lower abdominal quadrant. No signs of intestinal obstruction or peritonitis were present. Because a benzidine test for blood in the stool was positive, however, a diagnosis of chronic intussusception was made in spite of repeated negative barium enemas and upper gastro-intestinal series. On July 10, 1950 an exploratory laparotomy was done and a chronic jejuno-ideal intussusception was resected. An entero-enterostomy was done and the patient had an uneventful recovery. Within the intussusception, a large polyp was found. No evidence of any other polyps was detected at this operation. Microscopic examination of the polyp indicated it was benign.

Two years later, the patient was readmitted with a similar episode of severe recurrent cramping generalized abdominal pain of sudden onset. There was no history of nausea, vomiting, loss of appetite or constipation before the onset of pain on the morning of admission. Physical examination revealed diffuse tenderness throughout the abdomen, the pain being most severe about the umbilicus. No signs of intestinal obstruction or of peritonitis were noted. On the lips, about the corners of the mouth, and within the perioral mucous membrane, there were multiple small brownish-black pigmented areas that are known to be associated with multiple polyposis of the small intestine (1, 2) (fig. 1). Chronic intussusception was suspected and the patient was treated conservatively. The symptoms subsided and plans were made for barium enema and proctoscopy. However, 3 days after admission, the abdominal pain suddenly recurred. An exploratory laparotomy was done and another intussusception of the small intestine was found (figs. 2 and 3). This was reduced and another large polyp was found within the intussuscipiens. The segment of ileum containing the polyp was resected and an ileo-ileostomy was done. The patient had an uneventful convalescence and was discharged on the seventh postoperative day. Careful examination at the second laparotomy failed to reveal any other polyps.

Case 3, M. K. This 8-month-old boy was admitted with a history of vomiting for 6 days prior to admission. A physician had prescribed an enema and some of the expelled material was blood-tinged. The patient was observed to have periodic episodes of apparent pain alternating with periods of comfort. No abdominal mass could be felt. No abdominal distention or rigidity was noted. Rectal examination had been negative. The patient was treated conservatively for





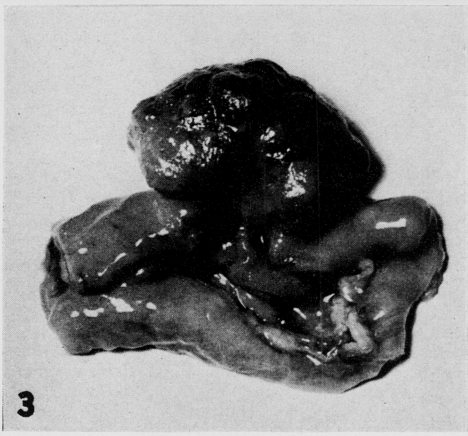


Fig. 1. Photograph of small, brownish, pigmented areas about the lips characteristic of multiple polyposis of small intestine.

Fig. 2. Intussusception of ileum found at second operation.

Fig. 3. Resected segment of ileum with polyp that was responsible for second attack of intussusception.

4 days and the symptoms apparently subsided. When they recurred, the patient was referred to The Children's Memorial Hospital where the above findings were confirmed. On initial examination in this hospital, no evidence of abdominal tenderness, rigidity or mass was noted. A tentative diagnosis of possible intussusception was made and barium enema was done on the day of admission. However, no definite evidence of intussusception was found.

During the afternoon following the first barium enema the abdominal pain recurred and a mass could be felt in the left lower abdominal quadrant. The barium enema was repeated and a typical pattern of intussusception was found. At the same time, the patient had a large stool of barium heavily tinged with bright red blood. An exploratory laparotomy was done. An ileocecal intussusception was found extending down to the sigmoid colon. The intussusception was easily reduced until it reached the ileocecal area where the wall of the terminal ileum and cecum was necrotic and rupture of the bowel occurred. The terminal ileum and cecum were resected and an end-to-end ileocolostomy was done. Postoperatively, the patient had a stormy but successful convalescence. He was discharged on the tenth postoperative day.

Meckel's Diverticulum: The diagnosis of Meckel's diverticulum was seldom made in the absence of signs and symptoms secondary to its complications. Twenty-six cases of Meckel's diverticulum were admitted to The Children's Memorial Hospital during 1948 to 1952. Twenty were associated with rectal bleeding without intussusception, two were associated with intussusception and one was associated with volvulus. Two had diverticulitis with perforation and peritonitis.

Those cases associated with intussusception had primarily the findings of intussusception. The rectal bleeding was secondary and moderate in amount. Those Meckel's diverticula with perforation presented the signs and symptoms of acute appendicitis with generalized peritonitis. The case of volvulus secondary to Meckel's diverticulum presented the findings of acute intestinal obstruction with gangrenous bowel. The rest of the cases of Meckel's diverticulum presented sudden onset of copious rectal bleeding, frequently of alarming proportions, without any other significant

abdominal findings. The episodes may have been recurrent, the history of bleeding varying from less than 24 hours to over one year. The age of the patients varied from 3 months to 12 years. Frequently, evidence of severe anemia was encountered and transfusion therapy had to be instituted. In the majority of these cases, ectopic gastric mucosa was located in the Meckel's diverticulum. The bleeding was secondary to peptic ulceration in the base of the diverticulum or in the wall of the adjacent small bowel.

Case Report

Case 4, T. K. This 1-year-old boy was admitted to The Children's Memorial Hospital, September 16, 1950, with a history of vomiting, irritability and constipation for one month before admission. Periodic enemas had controlled the constipation, but the patient had intermittent passage of dark red blood mixed with his stools. On the day of admission, the patient passed a copious amount of dark red blood per rectum and began to sweat profusely. He was admitted to the hospital where examination revealed a pale, acutely ill child in borderline shock. His diaper contained 300 cc. of freshly clotted blood. The abdomen was soft. No masses were palpable and normal peristaltic sounds were present. A diagnosis of bleeding Meckel's diverticulum was made. The patient received multiple transfusions and a bland diet and the massive rectal bleeding stopped. Two days after admission, a large Meckel's diverticulum was removed. The Meckel's diverticulum was located about 12 inches proximal to the ileocecal valve. In the ileum adjacent to the base of the diverticulum there was noted a large peptic ulcer which had served as the bleeding point. The diverticulum contained ectopic gastric mucosa on later microscopic examination.

Polyps: Symptoms from intestinal polyps varied according to the location of the polyp in the bowel. In general, two syndromes were encountered: 1) Those polyps located low in the rectum usually produced bright red blood per rectum. The bleeding was moderate to severe and frequently followed a bowel movement. The parents typically stated that following a bowel movement the patient would continue to strain or would ask to return to stool. A variable amount of bright red, recently clotted blood would then be passed. Not infrequently, the polyp would protrude beyond the anus and would be observed by the parents. 2) Those polyps located higher in the colon usually had severe anemia instead of hemorrhage as their chief complaint. When rectal bleeding did occur in these cases, the blood was bright red and either covered the stool or was mixed with the stool, depending upon the level of the polyp in the colon. The characteristic bleeding immediately following defecation did not occur; nor was the bleeding as severe as in the first group of polyps. For the most part, there was no obvious bleeding per rectum. The patient usually complained of weakness, easy fatigability and listlessness. He was pale and had severe anemia. Sometimes, extensive work-ups, including repeated barium enemas and even exploratory laparotomy, had to be done in order to locate the offending polyp.

Case Reports

Case B, S. H. This 4-year-old girl was admitted to The Children's Memorial Hospital with a history of intermittent, bright red rectal bleeding for 4 months before admission. The bleeding usually followed a bowel movement. The parents had noted, on several occasions, that a bright red mass of tissue protruded from the anus immediately following defecation. This mass would retract back into the rectum and could not be detected by repeated proctoscopy, barium enemas and gastro-intestinal series. Because of the persistence of rectal bleeding, another barium enema was being done when the mass protruded through the anus once again (fig. 4). The mass was caught and the patient was taken immediately to the operating room where a large rectal polyp was removed. It is interesting to note that, after the removal of the polyp, proctoscopic examination was repeated and the site of the polyp still could not be located. Microscopic examination of the polyp revealed benign adenoma.

The three types of rectal bleeding described above were encountered frequently and required major surgical correction. The remaining causes of rectal bleeding were treated by medical management, with or without minor surgical procedures. Thus, 32 of our cases were associated with diarrhea. Approximately 10 per cent of all cases of enterocolitis entering this hospital had minor rectal bleeding as part of their symptomatology. The bleeding disappeared as soon as the diarrhea ceased. Numerous other diseases of the colon, rectum and anus caused rectal bleeding in this series.

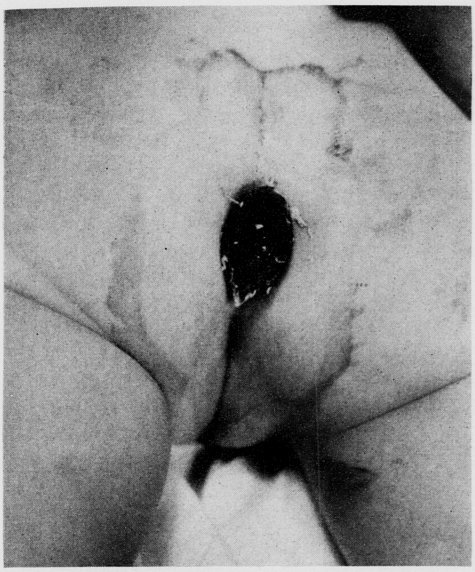


Fig. 4. Rectal polyps protruding through anus immediately after evacuation of the barium enema.

Twenty-four cases had anal fissure, 5 had fistula-in-ano, 2 had possible bleeding from hemorrhoids, 7 had rectal prolapse, 6 had ulcerative colitis and 11 had proctitis. The remaining 4 cases were caused by duodenal ulcer, biliary atresia or hemophilia.

In a significant number of cases, no definite cause for the rectal bleeding could be found. These cases occurred primarily in the neonatal period and probably were associated with mild hypoprothrombinemia. The bleeding was mild and of short duration. There was usually one brief episode which responded to conservative management and the administration of vitamin K.

The only other rectal bleeding presenting a typical clinical syndrome was that of bleeding secondary to anal fissure, usually in infants. The parents stated that the patient screamed in pain when he had a bowel movement. Bright red blood was noted covering the stool. Examination of the anus revealed a small fissure which responded well to oil administration.

Oral Bleeding

Oral bleeding occurred much less frequently than rectal bleeding. When it did occur, however, it was usually severe. It was often associated with systemic diseases that required extensive diagnostic evaluation and careful medical and surgical management. Note that 9 cases were associated with thrombocytopenic purpura, 5 of which ultimately necessitated splenectomy. Three cases had congestive splenomegaly (Banti's syndrome) that was treated by anastomosis between the portal and systemic venous circulations. Two cases had severe duodenal ulcer, one of them having a bout of massive hematemesis with shock which necessitated an emergency operation. Cirrhosis of the liver, hemorrhagic disease of the newborn and hemophilia also caused oral bleeding. One case had severe hematemesis from a Curling's ulcer of the stomach, secondary to extensive burns.

The diseases underlying oral bleeding, however, did not always cause gastro-intestinal hemorrhage. In the 5-year period covered by this study, there were 28 cases of purpura, only 9 of which had gastro-intestinal bleeding. In the same period a diagnosis of duodenal ulcer was made in 9 patients. Only 4 bled, 2 having hematemesis and 2 having occult blood or melena. Although one case of rectal bleeding and 5 cases of oral bleeding occurred in patients with hemophilia, there were 13 cases of hemophilia encountered during the period of study. In hemophilia, the gastro-intestinal hemorrhage nearly always followed trauma to the oral or rectal mucosa.

Case Reports

Case 6, M. H. This 4-year-old boy entered The Children's Memorial Hospital on November 15, 1950 with a history of intermittent blood-tinged vomiting for 20 days prior to admission. Five days after the onset of symptoms, the patient had massive hematemesis of bright red blood and went into shock. He was hospitalized elsewhere and received multiple blood transfusions. He continued to have large tarry stools and periodic hematemesis. He was transferred to this hospital where a tentative diagnosis of hiatus hernia with peptic ulceration of the esophagus was entertained. Because the patient continued to bleed and went back into shock, an emergency thoracotomy through the left seventh intercostal space was done. The esophagus and stomach were carefully examined and no pathology was found. Gastrostomy and duodenotomy were done. In

the posterior wall of the duodenum a small bleeding peptic ulcer was found. In view of the age of the child, subtotal gastrectomy was not done. Sutures were placed through the base of the ulcer and the superior pancreatico-duodenal artery was ligated. The postoperative convalescence was uneventful and the child was discharged on the tenth postoperative day. Laboratory examination on admission revealed a hemoglobin of 8.5 Gm. per cent and a red blood count of 2,700,000. At the time of discharge, the hemoglobin was 12.9 Gm. per cent and the red blood count was 4,120,000. There has been no recurrence of ulcer symptoms.

Case 7, R. P. This 9-year-old boy was apparently well until 6 months before admission, when an enlarged spleen was found during a routine physical examination. Symptoms did not appear until one month prior to admission to The Children's Memorial Hospital on November 25, 1949, when he had massive hematemesis and his hemoglobin dropped to 9.8 Gm. per cent. During the month before admission, there was no recurrence of hematemesis, but there was occasional evidence of occult blood in the stool. Esophageal varices were found on esophagram. A diagnosis of Banti's syndrome was made and a splenorenal shunt was advised. On January 7, 1950, a splenorenal shunt was done. Pressures in the portal system measured 370 mm. water preoperatively. Postoperatively, they dropped to 260 mm. water. The patient had an uneventful postoperative recovery and there has been no recurrence of bleeding since surgery.

Summary

1. Two hundred and twenty-six cases of gastro-intestinal bleeding encountered at The Children's Memorial Hospital from January 1, 1948 through December 31, 1952 are presented.
2. A total of 89 per cent had bleeding from the rectum and 11 per cent had oral bleeding. The major portion of the cases of rectal bleeding were caused by intussusception, Meckel's diverticulum and intestinal polyps. A significant number of the cases of rectal bleeding occurred in the neonatal period and no definite etiology could be found.
3. The characteristic patterns of rectal bleeding found in intussusception, diverticulum, intestinal polyps and anal fissures are described.
4. Although oral bleeding was relatively infrequent, it was usually associated with systemic disease which required extensive diagnostic effort and careful medical and surgical management.
5. Representative cases of gastro-intestinal bleeding are presented.

References

1. Jeghers, H., McKusick, V. F. and Katz, K. H.: Generalized Intestinal Polyposis and Melanin Spots of Oral Mucosa, Lips, and Digits: Syndrome of Diagnostic Significance, New England J. Med., 241:993, 1031, 1949.
2. Behrer, M. R.; Jejunal Polyposis with Intussusception and Melanin Spots, J. Pediat., 38:641, 1951.