

# Intramural Hematoma of the Duodenum and Jejunum: \*

## A Cause of High Intestinal Obstruction—Report of Three Cases Due to Trauma

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MECHANICAL ileus in the retroperitoneal duodenum is uncommon and, until recently, obstruction due to intramural hematoma was practically unknown. McLachlan<sup>6</sup> was first to describe this condition in 1838 and referred to his findings as "a false aneurysmal tumor involving nearly the whole of the duodenum." In 1959, Rowe, Baxter, and Rowe,<sup>8</sup> quoting a review by Spencer, *et al.*,<sup>9</sup> reviewed the literature to date and found only 40 reported cases of intramural intestinal hematoma causing intestinal obstruction and added a case of their own. Ferguson and Goade<sup>3</sup> have since reported a single case involving the duodenum and herein we report three additional cases, two involving the duodenum and one, the jejunum. This brings the total reported cases to 45, of which 24 involved the duodenum.

### Case Reports

**Case 1.** T. G., a 7-year-old boy admitted December 14, 1955, with severe, mid-abdominal pain and vomiting. Two hours prior to admission he bumped his abdomen on a chair while at play. Examination revealed his temperature to be 37° C., pulse 120, blood pressure 90/60. A visible, movable, exquisitely tender, doughy-feeling, orange-sized mass was palpable in the epigastrium. There was no external evidence of abdominal injury. Muscle guarding and rebound tenderness were present; peristaltic sounds were absent. Barium enema examination was negative but dilatation of the stomach was noted. Urinalysis was normal. Red blood cell count was 3,810,000 and hemoglobin was 11.8 Gm.; the

white blood cell count was 8,600 with normal differential distribution. He was submitted to emergency laparotomy with a diagnosis of active retroperitoneal hemorrhage. Retroperitoneal duodenum was involved with a huge, dissecting, intramural hematoma extending distalward into the jejunum, into transverse mesocolon, around the head and body of pancreas, retroperitoneally in front of the right kidney, behind the ascending colon, cecum, terminal ileum, and posterior pelvic peritoneum (Fig. 1a). Blood and clots were evacuated through an incision in jejunal serosa and denuded muscularis was noted coursing tortuously through the hematoma (Fig. 1b). A jejunal branch from superior mesenteric artery was bleeding freely and controlled with ligature. Resection of denuded jejunum was done with end-to-end duodenojejunostomy (Fig. 1c). 500 cc. of whole blood was given during the procedure and the abdomen closed without drainage.

Nasogastric suction was employed intermittently until the 8th postoperative day by which time it had become apparent an obstructive phenomenon was present. The gallbladder was palpable and he was icteric. Vomitus and yield of nasogastric suction did not contain bile. Total serum bilirubin was 11.6; direct fraction 7.4. On December 23, 1955, the abdominal wound was reopened. The stomach, 1st portion of duodenum, gallbladder, and common duct were markedly dilated secondary to periampullary duodenal compression by residual hematoma (Fig. 2a). Bypass of obstruction was accomplished by anterior gastrojejunostomy and cholecystojejunostomy (Fig. 2b). Nothing was done to the hematoma and the abdomen closed without drainage. Nasogastric suction was discontinued after 48 hours and he was able to tolerate liquids by mouth. Jaundice cleared promptly and he was dismissed from the hospital on the 9th day after second operation, 18 days after admission. Periodic follow up over a period of 5 years has revealed no sequelae and he appears to be a normal boy in every way.

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**Case 2.** M. H., a 19-year-old youth admitted July 16, 1959, with severe mid-abdominal pain of two hours' duration. Forty-eight hours prior to admission the automobile he was driving was involved in a collision inflicting blunt abdominal trauma with the lower edge of the steering wheel. Mild abdominal discomfort was present immediately after injury. Physical examination the day of injury yielded normal findings. X-rays of the abdomen, flat and upright views, were negative. He had minor digestive complaints the day following injury and remained away from work. The 2nd day after injury, the day of admission, he worked the full day as a carpenter's helper. Thirty minutes after eating a normal evening meal he was seized with sudden, severe, mid-abdominal pain. He lay down for an hour but the pain was unrelenting and progressive; he was brought to the emergency room. At the time of admission he twice vomited copiously of undigested food containing bile. He was writhing with abdominal pain. Temperature was 37.1° C., pulse 106, and blood pressure 114/80. There was no external evidence of abdominal injury. Epigastric tenderness was exquisite, muscle guarding marked, and rebound tenderness present. The abdomen was silent. Flat plate and upright x-rays of the abdomen were negative save for gastric dilatation. Urinalysis was normal, red blood cell count was 4,220,000, hemoglobin 13.3 Gm., hematocrit 40%, white blood cell count 10,100

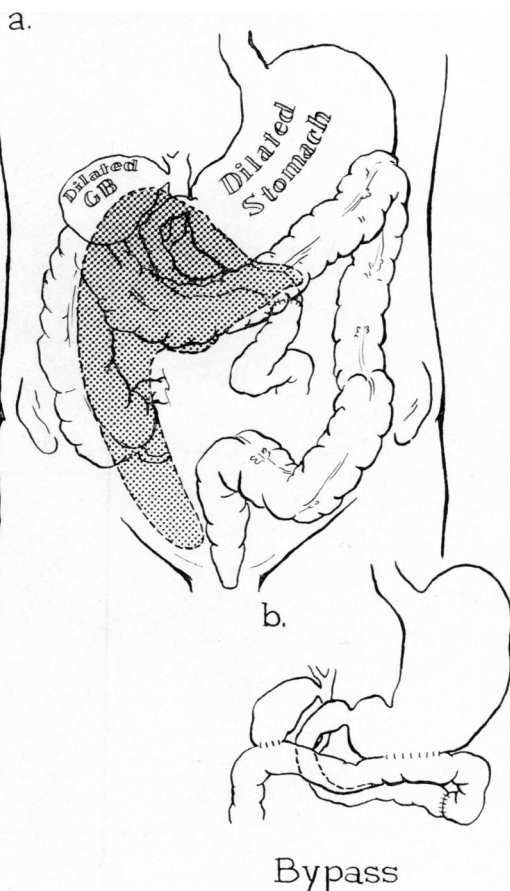
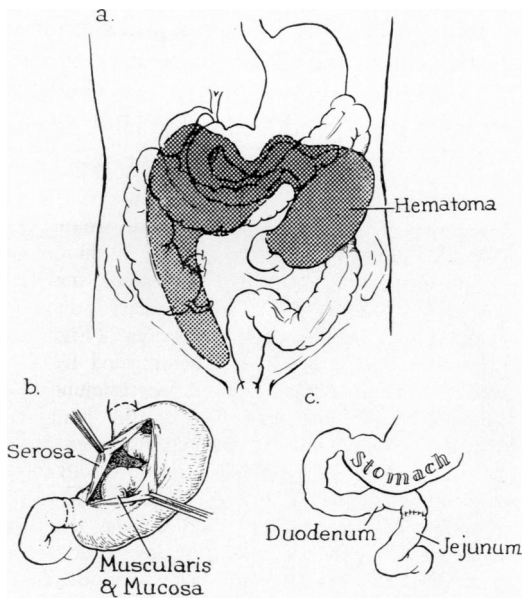


FIG. 2. (Case 1) Residual hematoma at second operation; bypass.



Hematoma Dissected

FIG. 1. (Case 1) Extent of hematoma at first operation; duodenojejunosotomy.

with normal differential distribution, and serum amylase was 200 Somogyi units. A diagnosis of injury to the retroperitoneal duodenum was made and he was submitted to emergency laparotomy. A doughy mass was palpable in the right hypochondrium after relaxation with general anesthesia. The 2nd and 3rd portions of duodenum were immensely distended with intramural extravasation of blood and clots (Fig. 3a). Serosal incision on anterior descending duodenum was done releasing 400 cc of blood and clots (Fig. 3b). No actual bleeding vessel was found. When it was apparent no further bleeding would occur, a ¼ inch Penrose drain was positioned along the 3rd portion of duodenum, the serosal incision closed around it, and the abdomen closed anatomically. After 48 hours nasogastric suction was discontinued and he was placed on oral feedings. His drain was removed the 6th postoperative day and he was dismissed from the hospital on the 9th day. He has suffered no sequelae from his injury.

## a. Intramural Hematoma

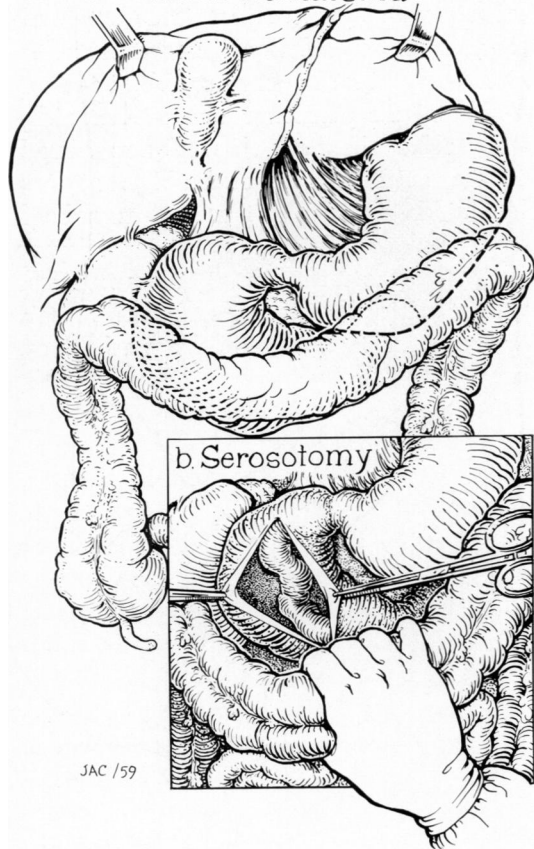


FIG. 3. (Case 2) Extent of hematoma; serosal incision in duodenum.

**Case 3.** W. T., an 11-year-old boy admitted October 14, 1959, with nausea, vomiting, and severe pain in the left hypochondrium of two hours' duration. Thirty hours prior to admission he was struck by a moving bicycle which bruised his left side on the chest, thigh, and knee. There were no abdominal complaints. During the day following injury he was anorexic and towards evening tenderness developed in the left hypochondrium. After eating a normal dinner he developed severe abdominal pain and vomited copiously of undigested food which contained bile. Temperature was 37.2° C., pulse 90, blood pressure 110/68. Exquisite tenderness and muscle guarding were present in the left upper abdominal quadrant, rebound tenderness was positive, and the abdomen was silent. A vague mass was palpable in the left hypochondrium. Red blood cell count was 4,500,000, hemoglobin 14.0 Gm., hematocrit 41%, white blood cell count 12,800, with normal differential distribution. Urinalysis was negative. X-ray of the chest was

negative. Plain x-ray films of the abdomen revealed dilatation of the stomach and duodenum with distension of the upper jejunum; the remainder of intestinal gas pattern was notably sparse. Intramural duodenojejunal hematoma was suspected and he was submitted to emergency laparotomy. A doughy mass was palpable in the left hypochondrium after the induction of general anesthesia. The upper jejunum harbored a dissecting, intramural hematoma involving 8 cm. of bowel (Fig. 4). Serosal incision was done for evacuation of blood and clots (Fig. 5). No bleeding vessel was found. After closure of the serosal incision, the abdomen was closed without drainage. Thirty-six hours after operation nasogastric suction was discontinued and he was started on oral feedings. No vomiting occurred and he tolerated steady increases in diet. He was dismissed from the hospital on the 7th post-operative day. His subsequent course has been uneventful.

### Discussion

Although intra-abdominal injury occurs frequently from blunt trauma, the transmission of force within the abdomen is still obscure. Burnett and O'Leary<sup>1</sup> have observed that once the force is dissipated against the spinal column or in rupturing or tearing a single organ, no further damage is caused. A single, unexpected blow appears to be more injurious, and the force of the blow need not be very great. Griswold<sup>5</sup> has suggested that nonpenetrating force has a predilection for solid organs or hollow viscerae close to their points of

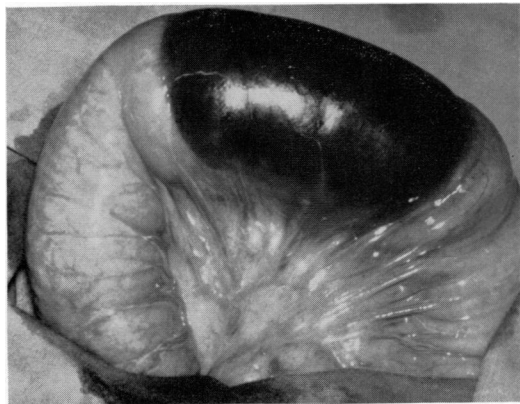


FIG. 4. (Case 3) Intramural jejunal hematoma causing obstruction.

fixation. Duodenum, upper jejunum, and terminal ileum are the most frequent sites of small intestinal injury due to their relative immobility. Injury is inflicted by the force of the blow impinging the viscus against the spinal column with a shearing action.

Intramural hematoma of the duodenum causing obstruction has been reported with pancreatitis, pancreatitis and carcinoma, blood dyscrasia, mesenteric cyst, ruptured aneurysm, and two cases have been reported without relationship to any known etiologic factor. The vast majority are the result of blunt trauma. In the majority of instances where there was a history of injury, the blow was considered to be of mild degree and seemingly inconsequential. Most patients were able to continue normal activities for hours or even days after injury before reporting for treatment. Characteristic *delay* in onset of severe symptoms was present in 2 of our 3 cases. All patients present with high intestinal obstruction. Abdominal pain is severe and vomiting copious. Rowe *et al.* states that a palpable mass is an uncommon finding. However, it appears to be present in about 50% of cases. A tender, doughy mass was palpable in all our cases. Because of tenderness and muscle guarding, the mass is more readily palpated after induction of anesthesia. Felson and Levin<sup>2</sup> described a "coiled spring pattern" demonstrable by barium meal which they consider pathognomonic for intramural duodenal hematoma. We were reluctant to fill the upper digestive tract with barium when it was apparent laparotomy was necessary anyway. X-rays demonstrated dilatation of the stomach and duodenum down to the point of obstruction by hematoma.

Operative treatment will usually be necessary. Simple evacuation of blood and clots relieves obstruction and is adequate in most instances. It is desirable, if possible, to locate and control the bleeding vessel. When the bleeding vessel cannot



FIG. 5. (Case 3) After evacuation of intramural jejunal hematoma.

be ligated, application of warm packs is indicated with a suitable period of observation for further bleeding. Drainage should always be employed when it is impossible to evacuate all of the hematoma. Closure of the serosal incision may or may not be necessary.

Pressure exerted by residual hematoma may occur and cause distressing postoperative complications. When evacuation of hematoma is incomplete, or when drains have not been used or function improperly, retained extravasations of blood in retroperitoneal areolar tissue gradually increase in size by virtue of attraction of tissue fluid. With the passage of time, intrahematoma pressure increases by ingress of fluid secondary to elevated osmolarity caused by protein products of hemoglobin disintegration. This phenomenon probably explains the characteristic delay between injury and onset of obstructive symptoms. Pressure from residual hematoma necessitated a second operation in Case 1 in order to bypass intestinal and biliary obstruction. Rowe *et al.* reported a similar complication in the form of persistent duodenal obstruction after evacuation of hematoma. They performed gastroenterostomy at a second operation without success and found it necessary to resort to a third operative procedure wherein they resected a valve-like mucosal fold from the duo-

denum at the site of earlier incision and drainage. Gastroenterostomy may be insufficient when duodenal obstruction is present in the presence of an intact pyloric sphincter. Gastric contents pass into duodenum and become trapped under pressure in a blind loop. Distension of the duodenum causes troublesome abdominal complaints after eating. Pyloroplasty concomitant with gastroenterostomy may obviate this difficulty. Duodenojejunostomy would be preferable if anatomically feasible. Gastroenterostomy alone worked satisfactorily in Case 1 of our series. Biliary obstruction and jaundice due to residual hematoma has been observed in two cases reported previously. Glass<sup>4</sup> reported a case of a newborn infant with biliary and pancreatic obstruction caused by intramural hematoma secondary to blood dyscrasia with a report of necropsy findings. Rowe *et al.* observed jaundice in their patient with elevation of serum bilirubin. They attributed part of the total elevation to resorption of hematoma but felt the major portion was due to biliary obstructive phenomenon. Jaundice cleared in five days after operation. Case 1 of our series is unique in that it represents the second instance where gastroenterostomy was necessary to bypass intestinal obstruction and the first case reported where biliary bypass was necessary.

Treatment of intramural hematoma of the duodenum and jejunum yields good results. Of the 24 cases involving the duodenum, there have been 4 deaths. Three cases were diagnosed at necropsy; the remaining death occurred in Oppenheimer's<sup>7</sup> patient who was found to have pancreatitis and carcinoma as the etiologic factor and died shortly after operation from shock. The remaining 20 patients made uneventful recovery without undesirable sequelae.

### Summary

Symptomatic intramural hematoma of the duodenum and jejunum is uncommon.

Blunt trauma is the principle cause and the force of the blow need not be very great. Symptoms are those of high intestinal obstruction. There is a characteristic *delay* between injury and onset of obstructive symptoms varying from a few hours to several days. Operative treatment with simple evacuation of hematoma is the treatment of choice. Drainage is necessary if the hematoma cannot be evacuated completely. Resection is rarely necessary, and virtually never in the duodenum. Bypass procedures may be required to relieve intestinal and biliary obstruction due to pressure exerted by residual hematoma.

Three cases of intestinal hematoma are reported, two involving the duodenum and one in the jejunum.

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