The Early Diagnosis of Acute Intestinal Obstruction*

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The purpose of this paper is to bring to your attention a frequently occurring condition, which has a high mortality rate despite the marked improvements recently made in surgical technique and management of electrolyte balance and infection. Where then lies the responsibility for the failure in the reduction of the mortality rate? This is the question which immediately faces us. The most singular factor responsible for this high mortality rate is the delay in diagnosis.

There is a tendency to consider intestinal obstruction as a distinct disease entity. Intestinal obstruction is merely a syndrome, resulting from varied causes. It is, therefore, well that we should consider the subject from the standpoint of the mechanism of its production. There are many excellent classifications of the subject to be found in literature, but the etiological classification as proposed by Wangensteen18 is probably applicable to more cases than any other, and with some minor additions and alterations is the one used in this discussion. Table 1.

I. Mechanical.

A. Hernia. (1) External, (2) Internal.
B. Adhesions or bands. (1) Congenital, (2) Inflammatory, (3) Traumatic; (a) early postoperative, (b) late postoperative, (c) without operation; (4) Neoplastic.
C. Volvulus.
D. Intussusception.
E. Narrowing of the lumen. (1) Strictures; (a) acquired, (b) congenital; (2) Obstruction.
F. Compression from without.

II. Neurogenic.

A. Spastic ileus.
B. Paralytic ileus.

III. Vascular.

A. Mesenteric thrombosis.
B. Mesenteric emboli.

C. Edema of the bowel (Hypoproteinemia).

Table I. Etiological classification of intestinal obstruction.

Irrespective of etiology, a thorough history and physical examination is imperative in the diagnosis of any condition. In intestinal obstruction, pain is the most constant factor present18. Its time of onset, its character, its location, its duration, and its relation to food and activity often serve as a clue to the correct diagnosis. The presence or absence of nausea and vomiting, their relation to the onset of illness, and the character and amount of vomitus are important facts to obtain. Constipation is the usual finding, but its absence does not preclude the diagnosis of intestinal obstruction, especially so early in the course of the process. The failure to pass flatus is considered strong evidence in favor of obstruction. The history of a previous operation is often a clue, and likewise the history of a hernia frequently gives a lead. Age and sex are frequently diagnostic factors. In the physical examination it is important to consider the patient as a whole. Frequently the facial expression will reveal the diagnosis. The state of water balance will often give an indication of the presence or absence of vomiting or diarrhea. The temperature may or may not suggest infection or strangulation. The absence of evidence of a respiratory infection will eliminate, to a great extent, the possibility of a tubercular or pneumococcc peritonitis. The state of the heart would eliminate vascular causes. Often the earliest indication of strangulation is an increase in the pulse rate. Inspection of the abdomen will reveal the amount and distribution of the distention; the presence or absence of previous operative scars; and the presence or absence of masses. Palpation of the abdomen will reveal the presence or absence of splinting, and it is important to determine whether it is voluntary or involuntary. Palpation will also determine the degree of abdominal tenderness, the character of a mass, and frequently the presence of peristaltic waves. Percussion determines if the distention is due to gas, fluid or soft tissue. Auscultation in addition to determining the presence of borborygmi, frequently

* Paper presented at the 13th Annual Clinic of the Union Community Hospital, Union, South Carolina, January 25, 1946.
localizes the point of obstruction by revealing the point at which the borborygmi reaches its greatest intensity. Inspection and palpation of the naturally occurring openings of the abdominal wall should be carefully done\textsuperscript{13}. A rectal examination often reveals valuable information.

Of the accessory clinical data, the white blood count is not diagnostic, though it is a valuable aid in determining the presence or absence of infection or strangulation, and is of considerable prognostic significance. Scout films of the abdomen often reveal the presence of gas in the small intestines, which in an adult is usually indicative of small bowel obstruction\textsuperscript{7}. Roentgenological examination furnishes valuable information as to the site of the obstruction, and in many cases will suggest the etiological factor\textsuperscript{2,5}.

According to reports from the leading clinics in the country, hernias account for the greatest single cause of intestinal obstruction. External hernias account for from 44 per cent to 54 per cent of the cases of intestinal obstruction\textsuperscript{11,12}. The syndrome presented by external hernia is well known. There is the history of the presence of a hernia, the onset of pain usually colicky in character, nausea, vomiting, constipation and the presence of a tender irreducible mass. The diagnosis is not hard to establish, but it is sometimes difficult to determine the presence or absence of strangulation; and important to do so from the standpoint of prognosis. The mortality increases in proportion to the degree of encroachment upon the blood supply\textsuperscript{1}. Marked tenderness over an irreducible mass, signs of toxemia with symptoms of obstruction, a change in the character of pain, and an increasing leucocytosis, point to strangulation.

Internal hernias, fortunately, constitute a small percentage of the cases of intestinal obstruction. Their presence is rarely suspected unless obstruction supervenes, and then the diagnosis is rarely made preoperatively.

Next in frequency to hernias as a cause of intestinal obstruction are those cases due to bands or adhesions\textsuperscript{31}. These constitute about 25 per cent of all cases of intestinal obstruction. Congenital bands account for a small number of cases. The vast majority of those cases due to adhesions are the result of inflammation and trauma. Meckel’s diverticulum is often a cause of obstruction due to inflammation and here the diagnosis is difficult. Most cases of Meckel’s diverticulitis are diagnosed as atypical appendicitis. McIver\textsuperscript{12} has conveniently divided cases due to trauma into three groups: early postoperative; late postoperative; and without operation. Appendectomy is followed by the highest percentage of those cases occurring in the early postoperative period, usually during the first 10 days. In many of these cases the adhesions are due to both trauma and infection. In the late postoperative period pelvic operations head the list. Since our discussion is concerned with acute intestinal obstruction, those cases due to neoplastic adhesions are usually chronic in their manifestation and will be omitted from this discussion. As to diagnosis of intestinal obstruction due to bands or adhesions, except for the congenital group, the history of the etiologic agent is always present and the findings which follow are those of colicky pain, nausea and vomiting, constipation, distention, and tenderness.

Bockus quoting Leonard and McIver list the frequency of volvulus as varying from 4 per cent to 15 per cent of the cases of intestinal obstruction. The diagnosis is rarely made preoperatively, and the condition is usually associated with some degree of strangulation. The diagnosis may be made by noting the suddenness of onset, frequently with a history of heavy meal after a period of fasting or the taking of a violent purgative. The pain usually is colicky at the onset, but may later change character, becoming dull as strangulation progresses. Nausea and vomiting are usually early. Constipation is rare in the early cases unless the sigmoid colon is the portion of intestine affected\textsuperscript{14}. Abdominal distention is marked in volvulus of the sigmoid colon, but late in small intestinal volvulus.

Intussusception accounts for only a very small percentage of the cases of intestinal obstruction in the adult, but in infancy and early childhood it is the greatest single cause. The characteristic picture is rarely seen in the adult, but in the infant or child it is usually typical. There is abdominal pain, vomiting, bloody stools, and a sausage shaped tumor is usually palpable in thin individuals.

Obstruction due to “paralytic ileus” probably occurs with greater frequency than obstruction from any other cause, though this is not borne out by recorded statistics. Following almost every abdominal operation there is a variable period when the intestines are quiescent and there is a failure to pass flatus\textsuperscript{1}. These cases are frequently labeled as “gas”, and in most instances clear up without
specific therapy. Early feeding and early ambulation are rapidly reducing the length of the obstructive period. The cases of "paralytic ileus" which are associated with infection are more serious and require immediate attention. Appendicitis is the most frequent cause. The syndrome is usually that of the findings of appendicitis, or other infectious causes, to which is added the picture of increasing toxemia, protracted vomiting, marked abdominal distention and constipation, though diarrhea may frequently be present.

Spastic ileus is rarely encountered, and the majority of cases occur in neurotic individuals. The symptoms are very much like those presented by mechanical obstruction, but usually lack the physical findings of mechanical obstruction and the accessory clinical data.

Intestinal obstruction due to acute occlusion of the mesenteric vessels requires immediate intervention if a hopeful prognosis is to be gained. The mortality resulting from mesenteric vascular occlusion is still very high and can only be reduced by early diagnosis and treatment. There is usually a sudden onset of severe central abdominal pain, marked nausea and vomiting. Constipation is the rule, and shortly after the onset the picture of intestinal obstruction is present. The pain is usually out of proportion to the physical findings and usually persist after the administration of anti-spasmodics or morphine. Shock is more pronounced than in most other abdominal conditions with the exception of acute pancreatitis. Blood is usually present in the vomitus and in the stools; however, the absence of this finding does not preclude a diagnosis of mesenteric vascular occlusion.

Intestinal obstruction due to edema of the bowel has recently been called to our attention by the observations of Leigh who reported several cases of intestinal obstruction in which he could find no apparent cause of the obstruction, and yet all in this group had a hypoproteinemia. Drew, Scudder and Papps in 1940 pointed out that in cases of resections and anastomoses, the stoma becomes swollen and obstructed, the motility of the gut is lessened and the tendency to ileus increased. They point out that it is important to do repeated plasma protein determinations to prevent water logging of tissues in face of a gradually falling plasma protein level. The plasma protein level in edema cases resulting from hypoproteinemia is usually reached at about 5 grams. However, in many of the cases of obstruction caused by edema of the bowel the initial level may be much higher due to hemoconcentration, and when the patient is dehydrated and the corrected plasma protein level is determined it is found to be below 5 grams.

The diagnosis of obstruction in these cases is made by careful appraisal of the clinical picture, exclusion of other causes, and finding a plasma protein level below 5.5 grams.

ILLUSTRATIVE CASES

Case 1. Male, aged 34, admitted to hospital complaining of nausea, vomiting, constipation, and crampy abdominal pains for 2 weeks. The pain was located initially around the umbilicus, and later became generalized. Anorexia was present at the onset, but the patient ate sparingly until his admission to the hospital. His pains were more intense by the intake of food, and only gaseous eructations afforded partial relief. The vomitus was described as being feculent in character. The past history revealed that the patient had been subjected to a resection of the intestines in 1935 because of a strangulated umbilical hernia.

The significant physical findings revealed an acutely ill male, who was markedly dehydrated. T.P.R. 97.6-84-18. There was a previous mid-line, mid-abdominal, well healed incision. The abdomen was moderately distended and non-tender. The pattern of the intestines could be seen and felt. The abdomen was tympanitic throughout. No borborygmi heard. Rectal examination was non-contributory.

Laboratory Data: W.B.C. 9,650; Polys 70 per cent; Lymphs 30 per cent; R.B.C. 5,500,000; Hbg. 105 per cent. Urine: Sp.gr. 1.008, otherwise negative. Blood chlorides 360 mgs.; N.P.N. 30 mgs.

A scout film of the abdomen confirmed the impression of intestinal obstruction. At operation dense adhesions were found constricting a portion of the ileum.

Case 2. Female, aged 46, admitted to the hospital after an illness of 5 days duration, complaining of colicky abdominal pain which began in the epigastrium and later shifted to the umbilical region. Nausea and vomiting occurred late in the course of the illness. Anorexia was present at the onset. There was a small bowel movement on the night of onset, none since. Several enemas were given, each returning as given. Past history
Fig. 1. (Case 1). Mechanical obstruction of the small bowel. Flat film of the abdomen showing marked dilatation of the small bowel which arranges itself in the "step ladder" formation obliquely across the abdomen.

sounds were audible on auscultation. Rectal examination revealed only tenderness in the prostrate gland.

Laboratory Data: W.B.C. 4,350; Polys 78 per cent; Lymphs 22 per cent; R.B.C. 6,180,000; Hbg. 105 per cent. Urine insufficient amount for Sp.gr. B.P. 120/100. The skin was cold and clammy. Head, neck, chest, and lungs were essentially non-contributory. The abdomen was markedly distended with involuntary splinting in the lower abdomen, bilaterally. There were no palpable masses. There was marked tenderness throughout the abdomen. Rebound tenderness was generalized. The abdomen was tympanitic throughout. It was completely silent on auscultation. A vaginal examination was not done. Rectal examination offered no additional information.

Laboratory Data: W.B.C. 8,600; Polys 79 per cent; Lymphs 21 per cent; R.B.C. 4,500,000; Hbg. 84 per cent. Urine was negative except for

was non-contributory.

Examination revealed an acutely ill patient whose facial expression suggested peritonitis. T.P.R. 98.3-80-20 nausea, vomiting, constipation and a painful mass in the right inguinal region. Anorexia was admitted. The pains were colicky in character, and had not changed in character or location since onset. The history of hernia dated back only two weeks prior to the onset of his present illness.

Physical examination revealed an acutely ill patient, with sunken eyes, markedly dehydrated and apparently in great pain. T.P.R. 97°-88-20, B.P. 120/85. Head and neck essentially negative except for signs of dehydration. Chest, lungs and heart were clear. Abdomen was flat with moderate involuntary splinting of the lower right rectus muscle. In the rt. inguinal region there was a firm, tender, smooth, irreducible mass measuring about 12 cm. by 4 cm. in size. No cough impulse was transmitted, and the mass was dull on percussion. No
an occasional pus cell and many R.B.C. N.P.N. 112.5. Creat. 2.5 mgs. Hematocrit 42 per cent.

A flat film of the abdomen substantiated the impression of a small bowel obstruction. At operation an acute suppurative appendicitis with perforation, generalized peritonitis, and paralytic ileus was found.

Case 3. Male, aged 53, admitted to the hospital after an illness of 5 days duration complaining of abdominal pain. Other findings negative except for 2 to 3 W.B.C. per HPF. N.P.N. 50 mgs. Blood chloride 500 mgs. (2 days after admission; initial specimen failed to reach laboratory).

The patient was immediately prepared for surgery, including an attempt to restore his fluids to normal, and at operation an incarcerated, complete, indirect inguinal hernia was found containing about 12 inches of ileum in the sac.

These three cases are presented to show the most common types of intestinal obstruction encountered in general practice, and offer an excellent prognosis when diagnosed early.

CONCLUSION

Intestinal obstruction occurs rather frequently in the course of general practice. The majority of cases are first seen by the general practitioner, and can be diagnosed at the bedside by him if a careful history is taken and a thorough physical examination is done. With early diagnosis the mortality will drop. The frequent types of intestinal obstruction are discussed, and illustrative cases are presented.

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