Current Practice

Pseudo-obstruction of the Large Bowel

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Malignant stricture, diverticulitis, and volvulus are the commonest causes of mechanical obstruction of the large bowel.[1 2] In these cases the cause of the obstruction is apparent after examination and investigation or at laparotomy. Occasionally patients are seen with similar clinical and radiological findings in whom no obvious cause for the colonic distension is found at laparotomy. The clinical picture is one of increasing abdominal distension, crampy abdominal pain, constipation or diarrhoea, vomiting, normal or obstructive bowel sounds, and a distended colon with fluid levels on *x*-ray examination. It is usually associated with intra-abdominal or generalized disease. Dudley *et al.*[3] and Stephens[4 5] called it "intestinal pseudo-obstruction." It has also been termed "idiopathic large bowel obstruction,"[6] "ileus of the colon,"[7] and "spastic ileus."[8 9 10] The variety of names illustrates well the divergence of thought on this condition.

Four further cases of large bowel pseudo-obstruction are described here and a detailed review is made of the literature. We have favoured the term pseudo-obstruction, as it is descriptive but not too specific.

Case 1

A 54-year-old foreman was admitted to the coronary care unit with severe chest pain. His blood pressure was 180/100 mm.Hg and he was not in circulatory failure. Electrocardiography showed a diaphragmatic infarct and the serum enzymes were raised (aspartate aminotransferase 107 units, serum lactic dehydrogenase 713 units). Serum electrolytes and urea were normal. The only medical history was of appendicectomy 20 years previously. He was given the standard treatment for coronary thrombosis and was anticoagulated with warfarin.

Two days after admission he first had crampy lower abdominal pain. Over the next few days this worsened and was associated with diarrhoea. The stools did not contain blood. On the fifth day his abdomen rapidly distended and he began to vomit. At this time the pains were frequent and severe.

On examination his abdomen was grossly distended but was not tender and masses were not palpable. Percussion was tympanitic and bowel sounds were tinkling in character. The rectum was ballooned and contained normal faeces.

Investigations showed: electrolytes normal, blood urea 70 mg./100 ml., and prothrombin time 9%. *X*-ray examination of the abdomen showed grossly distended loops of the entire large bowel, with multiple fluid levels. The small bowel was slightly dilated (Fig. 1).

He was treated initially by gastric aspiration and intravenous fluids. Despite this the abdomen continued to distend and he became increasingly distressed; operation was performed.

At laparotomy the entire large bowel was greatly distended down to the rectum. The small bowel was also slightly distended. Evidence of local haemorrhage or organic obstruction was not found. A defunctioning transverse colostomy was performed.

Postoperatively the distension remained for five days and bowel sounds were infrequent. He then began to pass flatus via the colostomy and rectum and his abdomen decompressed slowly over the next two weeks. A barium enema failed to show any lesion in the distal colon or rectum.

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Forty-six days after admission he was discharged home, and three months later his colostomy was closed. He has remained well and has had no further bowel complaints.

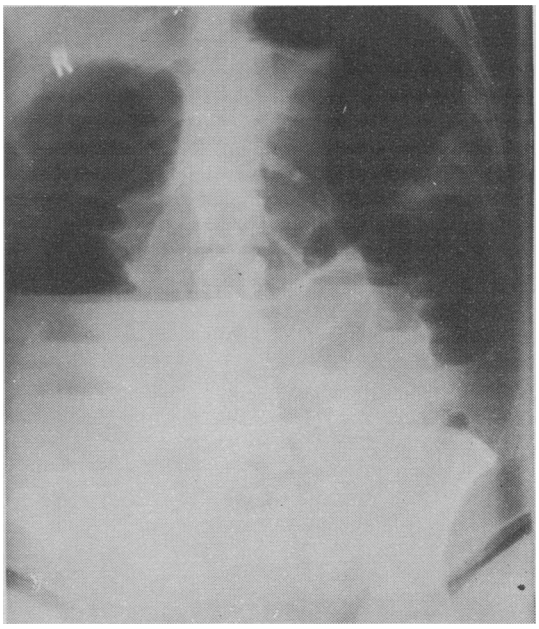

FIG. 1.—Case 1. Erect *x*-ray picture of abdomen.

Case 2

A 60-year-old labourer was admitted to hospital with a three-week history of vague upper abdominal pain which had become localized to the right hypochondrium over the last few days. He had been vomiting for two days and his last bowel motion three days earlier had been normal.

On examination he was dehydrated and his temperature was 101°F. (38·3°C.). His abdomen was not distended but was tender, with guarding on the right side. Murphy's sign was strongly positive. Bowel sounds were normal and the rectum contained faeces.

Investigations showed: haemoglobin 15 g./100 ml., W.C.C. 22,800/cu.mm., blood urea 103 mg./100 ml., and plasma specific gravity 1028. Straight *x*-ray film of the abdomen was normal. A diagnosis of acute cholecystitis was made.

The following day the pain had ceased but his abdomen was slightly distended. Bowel sounds were normal. Nasogastric aspiration and intravenous fluid therapy were started but the distension increased. *X*-ray examination of his abdomen two days later showed gaseous distension of the colon as far as the sigmoid colon, but there were no fluid levels. Gas was present in the rectum. Next day the distension had increased and his bowel sounds were high-pitched and tinkling. Mechanical obstruction of the large bowel could not be excluded and laparotomy was performed. Preoperatively his blood urea was 63 m.g./100 ml.

At operation pronounced distension of the entire large bowel was found, with slight distension of the lower small bowel. There was no evidence of mechanical obstruction. The gall bladder was gangrenous. A cholecystostomy was performed and the abdomen closed.

Postoperatively the distension had disappeared completely within 12 hours and he made a good recovery. Four months later cholecystectomy was performed. No lesion could be found in the large bowel. To date he has had no further bowel symptoms.

Case 3

A 50-year-old spinster with known rheumatic heart disease and mild Parkinson's disease was admitted to a general medical ward with left-sided chest pain of sudden onset. For the previous three months her abdomen had been "swollen."

Examination showed gross congestive heart failure with ankle and sacral oedema. The blood pressure was 180/80 mm.Hg. Bowel sounds were normal.

Investigations: chest *x*-ray examination showed gross cardiac enlargement and signs of cardiac defeat. Electrocardiography suggested pronounced myocardial ischaemia. Haemoglobin 103%, W.C.C. 9,400/cu.mm., electrolytes normal, P.S.G. 1028, and blood urea 94 mg./100 ml. Serum aspartate aminotransferase 56 units, serum lactic dehydrogenase 770 units.

She was treated with fluid restriction, digoxin, Navidrex-K (cyclopenthiazide), and Aldactone-A (spironolactone) and her cardiac state improved, though the congestive heart failure continued.

Three days after admission her abdomen became grossly distended. She had vague central abdominal pain, but did not vomit. Her bowels had not moved in hospital. Bowel sounds were tinkling in character. *X*-ray examination of the abdomen showed gross large bowel distension in the caecum and ascending colon with fluid levels (Fig. 2). The descending colon was distended to a lesser extent and gas was present in the rectum. Sigmoidoscopy to 30 cm. was performed. Nothing abnormal was seen and only a little gas and liquid faeces were released. A rectal tube was introduced a further 8 cm. with no result. The abdominal distension increased and despite her poor cardiac state laparotomy was considered mandatory. Preoperatively her blood urea was 136 mg./100 ml.

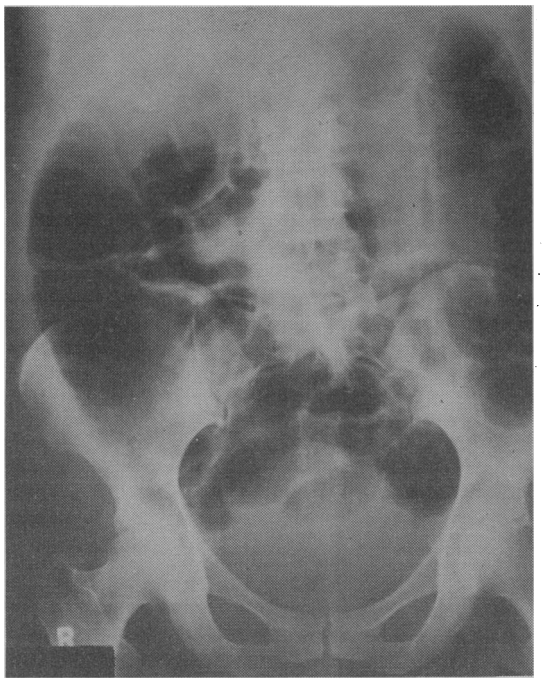

FIG. 2.—Case 3. Supine *x*-ray picture of abdomen.

At operation the colon from caecum to splenic flexure was distended to 6 in. (15 cm.) diameter. There was gas in the rectum and sigmoid colon and no organic obstruction could be found. A rectal tube was passed and the colon deflated.

The following day her abdomen was as distended and tympanitic as before operation. Her condition deteriorated and she died early the next morning. Necropsy was not performed.

Case 4

A 66-year-old man was admitted as an emergency with a history of vomiting, crampy abdominal pain, and increasing distension over the previous seven days. He had Parkinson's disease and a left hemiparesis as the result of a stroke nine years earlier.

On examination he was hiccoughing and dehydrated. His abdomen was distended with a visible swelling in the right lower quadrant. A splash could be elicited over this swelling, which was tender and tympanitic. Bowel sounds were increased. The rectum contained normal faeces.

X-ray examination of his abdomen showed a large fluid level in a grossly distended caecum. Numerous other dilated loops of bowel with fluid levels were seen and gas was present in the rectum. The blood urea was 58 mg./100 ml.

A diagnosis of acute caecal volvulus was made and laparotomy was performed. The caecum was grossly distended but not twisted. The large bowel from caecum to the upper third of the descending colon was also distended. The lower colon contained faeces and there was no obstructing lesion. The small bowel was not distended. A tube caecostomy was performed in the right iliac fossa and the midline incision was closed.

Immediately postoperatively the abdominal distension was greatly reduced and it further diminished over the next few days as the caecostomy functioned satisfactorily. His bowels moved after five days and the caecostomy tube was removed after 11 days, by which time bowel function was normal. The caecostomy wound was almost healed when he was discharged to a convalescent unit 16 days after operation.

Two weeks later he had a further episode of abdominal distension and crampy pain. This was treated conservatively with intravenous fluids and nasogastric aspiration and had settled again in a few days. Since then he has remained well.

Discussion

Various attempts have been made to classify the causes of this syndrome.[3 11] Some workers fail to distinguish between large bowel distension and small bowel distension. Some case reports are confusing, for "paralytic ileus" is described, though bowel sounds have been heard, and "pseudo-obstruction" is reported after intra-abdominal surgery. Other cases termed idiopathic would appear to have had additional disease sufficient to have caused the development of the syndrome. The cases referred to in this paper where true pseudo-obstruction of the large bowel was present are shown in Table I. On the basis of a study of these case reports we suggest the following aetiological classification.

TABLE I.—*Reported Cases of Large Bowel Pseudo-obstruction* and Associated Aetiological Factors*

Authors	No. of Cases	Intra-abdominal Inflammation	Retro-peritoneal Disease	Hypoxia or Cardiac Failure	Coronary Thrombosis	Systemic Infection	Idiopathic
Ogilvie[12]	2	0	2	0	0	0	0
Dunlop[13]	1	0	1	0	0	0	0
Macfarlane and Kay[10]	3	0	0	0	1	0	2
Dudley *et al.*[3]	6	1	0	1	0	0	4
Morton *et al.*[7]	3	0	0	0	0	3	0
Rothwell-Jackson[8]	3	0	1	1	0	1	0
Stephens[4]	4	1	0	2	0	0	1
Stephens[5]	2	1	1†	0	1†	0	0
Heitzman *et al.*[16]	1	0	0	0	1	0	0
Present series	4	1	0	1	1	0	1
Total	29	4	5†	5	4†	4	8

*Cases in which only the small bowel was involved or which occurred after intra-abdominal surgery or caesarean section have not been included.
†One case with chronic pancreatitis also had a coronary thrombosis.

Intra-abdominal Inflammation

Case 2 illustrates this group. A diagnosis of acute cholecystitis was made, large bowel obstruction developed, and at laparotomy a gangrenous gall bladder and very distended large bowel were the only findings. After cholecystostomy the distension rapidly disappeared and did not recur. Stephens[4,5] reported two similar cases associated with acute cholecystitis. It is well known that a localized ileus of the transverse colon may occur in such conditions as pancreatitis, cholecystitis, and an acute exacerbation of a duodenal ulcer, but this is quite different from the gross large bowel distension with increased bowel sounds which are characteristic of pseudo-obstruction. The colonic dilatation may be due to local irritation of the intrinsic nerve plexus in the bowel wall as suggested by Zimmermann.[11]

Retroperitoneal Disease

Ogilvie[12] described two cases of large bowel pseudo-obstruction in which he found unsuspected malignant disease in the region of the coeliac plexus. Other cases with retroperitoneal disease have been described[5,6,13] and this condition has become known as Ogilvie's syndrome. Ogilvie attributed the colonic distension to excessive and uncoordinated contraction of the muscle in the bowel wall after its sympathetic supply had been destroyed by the retroperitoneal tumour. He noted a temporary ring of spasm in the pelvic colon in one case. Fractures of the lumbar vertebrae and retroperitoneal procedures, such as lumbar sympathectomy, may also cause distension of the large and small bowel with audible bowel sounds.

Retroperitoneal tumours around the coeliac axis can only rarely give rise to pseudo-obstruction, but they must be looked for carefully in all cases.

Hypoxia and Congestive Cardiac Failure

Dudley *et al.*[3] drew attention to hypoxia as a factor in the occurrence of pseudo-obstruction. Hypoxia and congestive heart failure were the presenting features in our third case, in which massive large bowel distension developed after admission. Laparotomy can only have worsened her cardiac condition and it is significant that the operation did not relieve the large bowel distension, which persisted until her death. Two of Stephens's[4] four cases had congestive heart failure, and Rothwell-Jackson[6] reported a case with obvious hypoxia in which death occurred shortly after laparotomy.

It is not clear how hypoxia and heart failure may interfere with the motor function of the large bowel to produce the picture of pseudo-obstruction. The generalized metabolic upset with electrolyte imbalance and impaired renal function may produce neuromuscular incoordination in the bowel wall. Pseudo-obstruction can only be detrimental to cardiac function, for it produces fluid loss into the bowel lumen, elevation of the diaphragm, and compression of the splanchnic bed, with diminution in venous return.[14]

Laparotomy would always be a last resort in any patient with myocardial failure. The ability to diagnose pseudo-obstruction in such patients would strengthen the decision to continue conservative treatment.

Myocardial Infarction

Nausea and vomiting, with mild abdominal distension, are common in acute myocardial infarction and settle with the relief of the pain and shock. "Anticoagulant ileus"[15] is also well recognized in patients on prothrombin depressant drugs, the bowel distension being due to bleeding into the gut wall or retroperitoneally. The clinical picture here is of a "paralytic ileus" with absent bowel sounds, a tender distended abdomen, and evidence of a bleeding tendency in other parts of the body. The prothrombin time is usually below 10%.

An entirely different situation is illustrated by our first case. The patient's gross abdominal distension was associated with colicky pains, diarrhoea, and audible bowel sounds. His abdomen was not tender and, though his prothrombin time was low, there was no evidence of a bleeding tendency. Despite the formation of a defunctioning transverse colostomy, his bowel remained distended for about three weeks postoperatively.

Heitzman *et al.*[16] described two cases of ileus after myocardial infarction. One appears to have been a true paralytic ileus of the small bowel, but the other developed enormous distension of the large bowel with normal bowel sounds 10 days after a myocardial infarction. He was treated conservatively only to die 10 days later with a further infarction. At necropsy no lesion could be found in his bowel to explain the distension. Macfarlane and Kay[10] described a case in which the large bowel symptoms began after a coronary thrombosis, and in a case reported by Stephens[5] death occurred after a coronary thrombosis.

Again we can only suggest a connexion between myocardial infarction and large bowel pseudo-obstruction. It may be that after coronary occlusion arteriolar spasm in the mesenteric circulation occurs and results in gastrointestinal ischaemia. This in turn may interfere with the autonomic balance between the sympathetic and parasympathetic systems and produce incoordination of the large bowel.

Systemic Infection

Morton[7] described eight cases of ileus of the colon. Five occurred after intra-abdominal surgery or caesarean section and these have been excluded from this review. The other three cases are typical of large bowel pseudo-obstruction and each was associated with a systemic infection. One case had infected gangrene of the lower limbs, one had septicaemia, and the third had pneumonia. Rothwell-Jackson[6] reported an "idiopathic" case with persistent pyrexia of unknown origin.

How a systemic infection affects large bowel motility is unknown. That the distension of the large bowel was gross is evident in that three out of these four cases developed gangrene and perforation of the caecum.

Idiopathic

There remains a group of cases with the typical syndrome but no other associated disease. In the absence of further knowledge these must be considered idiopathic.

Stephens[4,5] stressed the importance of renal impairment in the aetiology of this condition and wrote: "It is most commonly associated with established or incipient renal failure." Two of the six cases reported by him had renal failure with a very high blood urea. Nevertheless, in no other case in the literature has renal failure been present. In the four cases described here the blood urea was raised, but with subsequent rehydration three cases quickly reverted to normal. In the third case the raised urea was due to congestive heart failure from which the patient never recovered. Another factor mentioned is a low serum potassium.[6] While these factors may contribute to the aetiology of pseudo-obstruction, we feel that their importance has been overemphasized.

Morton *et al.*[7] and Robertson *et al.*[17] mentioned the occurrence of the syndrome after abdominal surgery, especially caesarean section. We believe that the peritoneal cavity after abdominal surgery or pregnancy cannot be considered normal and therefore have excluded such cases from our discussion.

Diagnosis

Several observations may help in the recognition of this syndrome and in differentiating it from carcinoma of the colon, the usual preoperative diagnosis.

Table II.—*Method of Bowel Decompression Used in 20 Cases Taken from Literature and in the Present Four Cases*

	No.	Distension Permanently Relieved	Recurrent Distension Postoperatively	Postoperative Death	
				Still Distended	Other Causes
Enterotomy	14	7	6	3	1
Passage of flatus tube during operation	2	0	2	1	0
Caecostomy (3 had gangrene or perforation of caecum)	4	4	0	0	0
Transverse colostomy	5	2	3	1	1
Total	25*	13	11	5	2

*One patient had caecostomy and transverse colostomy.

Presence of Other Disease.—Pseudo-obstruction is usually associated with other disease such as generalized infection, acute cholecystitis, myocardial infarction, or congestive heart failure.

Erect and Supine X-ray Film of Abdomen.—Characteristic of pseudo-obstruction is the presence of gas in the distal colon and rectum. It was present in each of our cases (Figs. 1, 2). This is probably the most useful aid to a diagnosis of pseudo-obstruction, provided that a toxic dilatation of the colon can be excluded on clinical grounds.

Faecal Occult Blood.—Tests for faecal occult blood are often positive in carcinoma but not in pseudo-obstruction.[3] They are, however, so unreliable that their value is limited.

Sigmoidoscopy and Passage of Flatus Tube.—This may aid both diagnosis and treatment. It was attempted in one of the present cases, but only a small amount of flatus was obtained and the obstruction was not relieved. In this case, however, the distension was proximal to the splenic flexure. In cases where the distension involved the pelvic colon this procedure might be expected to be more successful.

Barium Enema.—Morton *et al.*[7] emphasized the importance of barium enema and wrote: "Omission of barium enema in the evaluation of a patient with marked distension of the large intestine can lead to serious error in diagnosis and treatment." In two of their three cases barium enema was performed and they were able to fill the distended bowel and show that there was no mechanical obstruction. Nevertheless, great care must be taken not to distend the bowel even further during the examination. Both their patients who had this radiological investigation were subsequently found to have a perforation of the caecum. Barium enema was not performed in the present series.

Treatment

When the diagnosis is made preoperatively the following measures are of primary importance: correction of any fluid and electrolyte imbalance with intravenous therapy, vigorous treatment of any associated disease or infection, and decompression of the bowel. Nasogastric suction is usually carried out but is not very effective. Passage of a flatus tube may be more successful. The main aim of conservative management is to avoid surgery in a seriously ill patient. Emergency laparotomy is indicated if conservative measures fail and the distension continues or increases, particularly if the diagnosis remains in doubt. It becomes mandatory if pain and rebound tenderness develop in the right iliac fossa indicating impending or actual perforation of the caecum.[7 17]

Laparotomy was performed in each of the present cases and has been performed in nearly all reported cases. It permits the recognition and treatment of any other intra-abdominal conditions which may, as in Case 2, bring about rapid restoration of normal bowel function. It may forstall rupture of the caecum[6] and permits its treatment if it has occurred. The distended bowel can be adequately decompressed, reducing the embarrassment to the patient's circulation and respiration and making fluid and electrolyte management more easy.

The decision whether to decompress the bowel by enterotomy or passage of a flatus tube during the operation, or more permanently by transverse colostomy or caecostomy, is a difficult one. The operative procedure in 20 cases from the literature and in the present four cases is shown in Table II. It can be seen that enterotomy relieved the distension in only half the cases in which it was used, and that half of those whose pseudo-obstruction persisted died from causes related to or worsened by the abdominal distension.[3] It was most effective in cases where the pseudo-obstruction was associated with a treatable intra-abdominal condition—for example, in Case 2. Passage of a flatus tube had only a temporary effect in Case 3, whose recurrent distension contributed to her deterioration and death.

Even transverse colostomy failed to relieve the distension in three out of five cases in which it was performed. In our first case the distension subsided only after three weeks.

Of great interest is the fact that all patients with a caecostomy did well, despite the presence of peritonitis after perforation in two cases. Caecostomy is a simple procedure; it adequately decompresses the large and small bowel and can be performed "blind" under local anaesthesia in a seriously ill patient. Its use in malignant obstruction of the distal bowel is limited, but in a case of suspected pseudo-obstruction it may well be the procedure of choice.

Prognosis

Once a patient recovers completely from his illness secondary pseudo-obstruction does not recur. Nevertheless, about 25% of the patients reviewed died with pseudo-obstruction still present, usually from cardiovascular and respiratory insufficiency. Patients who have recovered from idiopathic pseudo-obstruction are said to be subject to recurrences. In our fourth case abdominal distension did recur after his discharge from hospital but soon settled with conservative treatment.

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