Current Practice

DISEASE OF THE DIGESTIVE SYSTEM

Intestinal Obstruction

P. G. BEVAN,* CH.M., F.R.C.S.

(Last week Mr. Bevan discussed the mechanisms and modes of presentation of intestinal obstruction. This week the article is concluded with an account of the clinical patterns of obstruction and their management.)

Clinical Patterns

The next step in diagnosis is to assess in each patient how the obstruction is developing in relation to time. Four common patterns are encountered—acute, subacute, chronic, and intermittent.

Acute intestinal obstruction is to be distinguished from the other three forms in that the obstruction rapidly becomes complete and irreversible. The abdominal distension increases progressively, and this can be confirmed by repeated measurements of the abdominal circumference at the umbilicus by a tape measure ; pain loses its periodic nature and becomes persistent and worse ; constipation becomes absolute ; gastric aspirates persist or increase ; fluid levels multiply on repeated x-rays ; and the patient's general condition deteriorates. By tracing back the history of the last few days a patient may be recognized as having acute obstruction on admission, or the abdominal distension may be " drum tight " in degree. Operation is then mandatory. This pattern is commonly met with in obstruction due to carcinoma of the colon.

In some cases the obstruction never reaches this degree. The abdomen remains only moderately distended and is not tender ; the patient has an occasional bowel action or a positive response to an enema, and only an occasional vomit ; the general condition is maintained. This is usually termed *subacute* obstruction, as exemplified by diverticulitis of the sigmoid colon,[6] and often settles without operation.

Chronic intestinal obstruction is seen in low grade inflammatory conditions of the small intestine, such as Crohn's disease (Fig. 7) or tuberculosis. The clinical features may extend over weeks or months, with only mild abdominal distension, recurrent colic, and troublesome constipation. Diarrhoea may be an expression of chronic obstruction, owing to the bowel proximal to the incomplete lesion being continually stimulated to contract in an attempt to overcome the blockage, resulting in the persistent passage of fluid faeces through the stenosed segment.[7]

Finally, the clinical pattern may be an *intermittent* one, with acute but short-lived attacks of obstruction over a period of years. This occurs in the presence of intraperitoneal adhesions, and the patient has usually had one or more previous abdominal operations, often attended by sepsis. The decision on whether to operate again or not is a difficult one, and depends on whether the obstructive episodes are becoming worse and more frequent or are dying away over a period of time. Laparotomy for adhesions can be hazardous for the patient, as the bowel may be perforated during the procedure and even worse adhesions may accrue ; however, it may be rewarding, as a single adhesion may be at fault and easily corrected.

Pathological Causes

In most cases identification of the pathological lesion causing the obstruction is the last stage of the diagnosis, usually discovered or confirmed only at laparotomy. The main exception is an obvious strangulated hernia, but a Richter's hernia can escape preoperative detection. Presumptive diagnosis, of course, can be fairly exact if made in the light of the nature and development of the obstruction, as described above, and the age of the patient ; in infants the common cause is congenital, in young adults usually inflammatory, in the elderly carcinoma or diverticulitis, and in the senile often ischaemic. This in fact is the least important diagnosis to make, but may influence the management and prognosis and therefore should be made. However, no patient in the older age group with
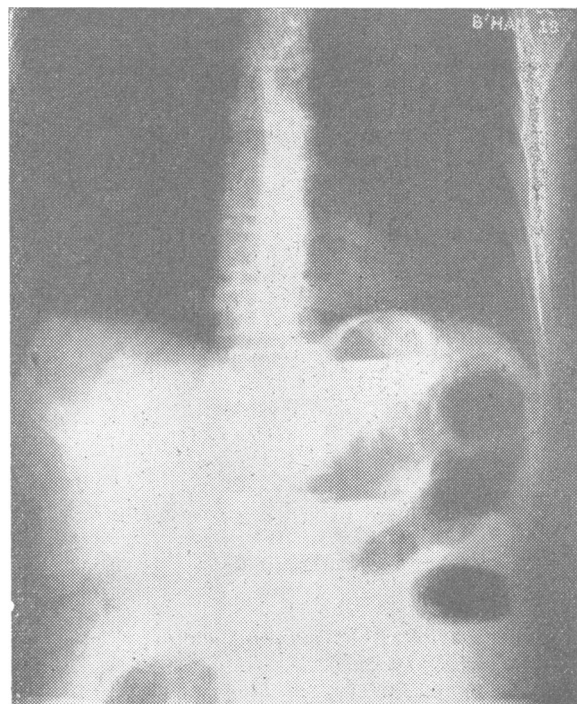

FIG. 7.—Chronic intestinal obstruction due to Crohn's disease.

* Consultant Surgeon, Dudley Road Hospital, Birmingham.

obstruction should be written off as having advanced carcinoma, as the finding at necropsy of a simple benign lesion is tragic. The time-honoured classification of pathological causes of obstruction is luminal, mural, extrinsic, and functional.

Causes *in the lumen* are usually swallowed food or foreign bodies. Astonishing feats of deglutition have been performed, usually inadvertent or careless but occasionally voluntary, as in Munchausen's syndrome. Patients affected are often edentulous, with resulting deficiency of mastication, and a common cause of stoppage is a semi-solid mass of orange or lemon pith,[8] although peel-eaters are not infrequently encountered. Patients who have had a partial gastrectomy are more liable to this complication,[9] as there is no pyloric sphincter to delay the progress of large solid masses. A large gallstone may ulcerate through from the gall bladder into the duodenum or even transverse colon and cause obstruction in the lower levels of the intestinal tract, usually in elderly decrepit women ; there may be no evidence of any acute episode previously to mark the occurrence of the fistula. The patients in this group usually present with such agonizing and persisting colic that operation is forced upon the surgeon before any severe degree of obstruction has had time to develop.

Causes *in the wall* of the bowel fall into two main groups, inflammatory and malignant. Inflammatory causes occur in specific age groups: appendicitis or its complications in children, regional ileitis in young adults, and diverticulitis in elderly women ; with the increase in the immigrant population in recent years tuberculosis is responsible for some cases in this group. Carcinoma of the colon is probably the commonest cause of intestinal obstruction ; it occurs usually during the second half of life, and takes the form of a ring lesion in the left side of the colon, usually sigmoid. Attention is usually drawn to it early, as obstruction tends to occur before the growth has had time to infiltrate or metastasize. Results of surgery are fairly good in the main. The earliest symptom is a change in bowel habit, either constipation, diarrhoea, or alternation of the two. Carcinoma of the right side of the colon usually takes the form of an ulcerative lesion in the caecum, and this causes obstruction only if the ileo-caecal valve is involved. Malignant disease of the small bowel is a rare cause of obstruction, but does occur as either carcinoma or lymphosarcoma.

Extrinsic causes of obstruction include adhesions, volvulus (recognized by one long fluid level on straight x-ray due to a single very dilated loop, usually of sigmoid colon), and infiltration or pressure of a tumour arising from outside the bowel.

Functional conditions of the bowel take the form of paralytic or spastic ileus. Peritonitis has already been mentioned, leading to toxic paralysis of the bowel. Pseudo-obstruction may occur in diseases of the bowel wall, as in steatorrhoea[10] or the severe colonic dilatation of severe ulcerative colitis.[11] Ileus may also result from the side-effects of drugs (such as the ganglion-blocking agents used in hypertension), the reflex effect of injury (fractures of the spine or retro-peritoneal haematoma), electrolyte imbalance (as in adrenal insufficiency), cardiac failure (presumably due to congestion of the bowel wall), or uraemia,[12] and it may be due to haemorrhage into the bowel wall as a complication of anticoagulant therapy.[12] It is not unknown for patients in this group to have undergone laparotomy, and both practitioners and surgeons need to be familiar with the medical causes of intestinal obstruction.

Management

Treatment has three objects—relieving the obstruction, reversing its complications, such as dehydration, and curing its cause. Successful management of the patient depends on co-ordination of conservative and surgical measures.

Conservative treatment must be instituted without delay in every case, and consists in the interacting triad of gastric aspiration, intravenous transfusion, and analgesia. Copious vomiting is the indication for the passage of a nasogastric tube to empty the stomach. There are many reasons for this: repeated vomiting is weakening, especially to elderly patients, and must be prevented ; the amount of the gastric aspirates will provide an index of whether the obstruction is progressing or remitting, and its nature will be a guide to the level of the obstruction ; the dangerous complication of aspiration pneumonia, again likely in the elderly, will be avoided. Continuous suction is sometimes employed, but this may lead to excessive dehydration of the patient by reversing the upper alimentary flow and not allowing any fluid to pass distally. Periodic aspiration is to be preferred.

Obstruction immediately deprives the patient of oral intake, and survival depends on intravenous transfusion. The drip must be started urgently, and, whether needle or polyethylene tube is used, the bore must be sufficient to deliver plasma or blood at an adequate rate. A preliminary and provisional estimate must be made of the fluid deficit, and this can be done in three ways: (1) By adding up the total amount of vomit since the patient was last able to drink, including receptacles filled and clothes and bedding soaked by vomit. The patient and relatives must be questioned about this, and the family doctor can help by including an approximate estimate in the admission letter. (2) By looking for signs of clinical dehydration in the patient. Where these signs are present a useful rule of thumb is that there is at least a 6% deficiency of extracellular fluid. (3) By counting the number of fluid levels and noting their length on an erect plain film of abdomen (Fig. 4). Familiarity with the fluid equivalent can be obtained by measuring the amount removed from the intestines by suction at the subsequent operation. It is not desirable or useful to aim to restore all this fluid quickly before operation is undertaken. It is not possible to restore completely the fluid balance of a patient who is completely obstructed. A sudden large transfusion of saline may well precipitate congestive failure or pulmonary oedema in an elderly dehydrated patient. Infusion of a large amount of saline before the obstruction is relieved will increase the amount of fluid secreted by the obstructed loop and add to the volume in the lumen and the oedema of the bowel wall, leading to a vicious circle which makes the obstruction worse. However, it is important to gain a rough idea of the total deficiency and plan a reasonable transfusion in two parts—replacement fluid to be given during the initial 6 to 12 hours and maintenance fluid from then on, detailed for periods of 24 hours in advance. There are two guides to the composition of fluid to be given: the obstructed intestine " leaks " fluid very similar to that in the extravascular compartment, and any patient with clinical signs of dehydration is losing a considerable amount of potassium into the lumen. In general, this means that the transfusion should take the form of normal saline with potassium added in the proportion of at least 25 mEq/l. Frequent estimations of serum urea and electrolytes should be carried out with packed cell volume and acid-base balance, and a check kept of the amount and electrolyte content of the urine and the gastric aspirate so that specific deficiencies can be corrected.

The most serious consequence of severe fluid loss is reduced plasma volume, which may lead to peripheral circulatory failure. This must be corrected by infusing plasma or dextran (and in the case of strangulation whole blood) in amounts adequate to restore a normal blood pressure before operation is undertaken.[13] The loss of extravascular fluid *per se* is not nearly so serious, and can be restored slowly and often mainly by mouth once the obstruction has been relieved.

Finally, adequate analgesic drugs must be given. Morphine is the most useful or pethidine for the elderly. Any theoretical objection, such as their spasm-inducing property, is outweighed by their excellent analgesic and sedative action.

Surgical Treatment

Urgent operation is indicated for patients with acute obstruction and where strangulation or closed-loop obstruction is suspected. In the other groups patients must be assessed daily in the first place and operation performed if the obstruction is progressing.

The main object of the operation is to relieve the obstruction, but in many cases the cause can also be removed. Where it is not possible to decide on the cause or the level of obstruction preoperatively the most useful incision is the right paramedian, through which the great majority of conditions in the abdomen can be effectively reached. On opening the abdomen, if the cause is not immediately evident the caecum should be examined ; if distended, the cause is in the colon ; if not, in the small intestine, which should then be followed until collapsed and distended bowel meet. Once the primary cause has been dealt with the whole length of the small intestine proximal to the obstruction must be emptied with a long sucker bearing a perforated sheath to overcome the secondary obstruction and deflate the bowel, so letting its wall start functioning again in the form of contraction and absorption.

Small intestinal lesions can usually be treated definitively by release of strangulation, division of adhesions, or resection and anastomosis in the case of a tumour.

The classical method of dealing with a colonic lesion is in three stages—proximal colostomy, interval resection, and final reconstitution or closure of colostomy. However, this programme means long hospitalization and repeated operations, often in frail elderly patients, and in many cases can probably be improved upon. Brooke[14] advised contraction to two stages by placing the colostomy just proximal to the obstructing lesion, usually carcinoma of sigmoid, and resecting both the carcinoma and colostomy at the second stage with anastomosis. Certainly a transverse colostomy for a distal lesion is to be avoided wherever possible in view of the tendency of the anastomosis to close down from disuse before the colostomy

is closed. Sames[15] suggests resecting the obstructing lesion initially and leaving a colostomy, with elective reconstitution at a second stage, in an endeavour to improve prognosis and shorten the duration of illness. Where a junior surgeon is operating under difficult conditions at night a proximal colostomy is still the safest procedure. However, when conditions are suitable and in the hands of an experienced surgeon resection and anastomosis can often be carried out in the presence of obstruction, possibly with a safety valve caecostomy, to reduce the surgical treatment to one stage. This may well be one way of improving the mortality and morbidity of this serious condition.

In patients with inoperable carcinoma there is an important place for palliative surgery. No patient should be allowed to die of intestinal obstruction, with the attendant vomiting and pain, and an effort should always be made to relieve distress with a colostomy or palliative bypass. We should make it possible for our patients not " to lie in cold obstruction and to rot."

I should like to thank Dr. P. Carpenter for help in providing the radiographs.

REFERENCES
[1] Hughes, E. S. R., *Brit. J. Surg.*, 1966, 53, 593.
[2] Wells, C., Rawlinson, K., Tinckler, L., Jones, H., and Saunders, J., *Lancet*, 1961, 2, 136.
[3] Wangensteen, O. H., *Intestinal Obstruction*, 1947, 2nd ed. Thomas. Springfield, Illinois.
[4] Shields, R., *Brit. J. Surg.*, 1965, 52, 774.
[5] Luck, R. J., and Eastcott, H. H. G., *Brit. med. J.*, 1961, 1, 1200.
[6] Bevan, P. G., *Brit. med J.*, 1961, 1, 400.
[7] Shipman, J. J., *Lancet*, 1959, 1, 232.
[8] Davies, D. G. L., and Lewis, R. H., *Brit. med. J.*, 1959, 2, 545.
[9] Powley, P. H., *Brit. med. J.*, 1961, 2, 1392.
[10] Stephens, F. O., *Brit. med. J.*, 1962, 1, 1248.
[11] Sampson, P. A., and Walker, F. C., *Brit. med. J.*, 1961, 2, 1119.
[12] Edwards, E. C., *Brit. med. J.*, 1962, 1, 1107.
[13] Beamish, R. E., and McCreath, N. D., *Lancet*, 1961, 2, 390.
[14] Wilkinson, A. W., *Body Fluids in Surgery*, E. and S. Livingstone. 1960.
[14] Brooke, B. N., *Lancet*, 1955, 1, 945.
[15] Sames, C. P., *Lancet*, 1960, 2, 948.

TODAY'S DRUGS

With the help of expert contributors we print in this section notes on drugs in current use.

Drugs for Depression

This is the first of four articles on drugs used in treating depression. Other articles deal with monoamine oxidase inhibitors and tricyclic antidepressants, and the fourth article will discuss the selection of drugs in the management of various forms of depression.

Amphetamines and other Stimulants

Amphetamine was introduced into clinical practice in 1935, at first for the treatment of narcolepsy. The drug's stimulating effect on the central nervous system and the transitory euphoria induced led to its use in depressive illness.

Pharmacologically its properties are not fully worked out, but its stimulant effect is probably due to its ability to release noradrenaline from its binding sites, and this has been shown to hold for brain as well as peripheral sites.[1 2] Reserpine, which also releases noradrenaline from binding sites, but which results in the animal becoming " depressed," seems to release the noradrenaline intracellularly, where it is metabolized by monoamine oxidase. Amphetamine, which stimulates the animal, releases the noradrenaline on to receptor sites, where it is metabolized by catechol-*o*-methyl transferase.

E

Clinical Use

The amphetamines have limited value in the treatment of endogenous depression. Apart from their having little effect in other than very mild depressive states with symptoms mainly of fatigue, their action is short-lasting and may be followed by an even deeper depression. For this reason they are almost always used only when the depression is limited to one part of the day—for example, early morning—or perhaps to counteract the depressing effect of the major tranquillizers.

They are much more effective in the " neurotic " or neurasthenic states secondary to an inadequate personality, where the patient is unable to cope with everyday tensions, is mildly and chronically depressed, and constantly complains of lethargy and apathy. Unfortunately, because of the nature of the condition, such patients are likely to become dependent on the drugs. Furthermore, if other than small doses are used tolerance may occur, with increasing doses having to be used to obtain the same effect.

For these reasons stimulant drugs should be used only after giving the matter very careful thought, and even then the doctor should prescribe the drugs only in short courses to tide the patient over a particular crisis or with a definite aim such as a return to work. The drugs are best used in a delayed release form, when the stimulant effect is not so dramatic, the " let down " effect is less pronounced, and the danger of habituation and tolerance is decreased.

Amphetamine has side-effects which reflect sympathetic over-activity: dryness of mouth, sweating, tremor, tachycardia, hyper-reflexia, insomnia, and diminution of appetite. Dextro-