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INTESTINAL OBSTRUCTION*

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Intestinal obstruction seems to me to be a subject that should interest a very large part of the profession. General practitioners, physicians, surgeons, even gynaecologists, are not infrequently confronted by these cases, and occasionally those who specialize in departments more remote from the abdomen may be invoked in the differential diagnosis of, shall we say, cerebral tumours and meningitis. Further, I always regard intestinal obstruction as the one condition where we seem to have made least improvement in results since the rise of abdominal surgery in the past thirty years, at any rate as compared with other urgent conditions of frequent occurrence, such as appendicitis and perforations of peptic ulcers. To the surgeon, obstruction appears an important disease, because it is not uncommon, not always easy to diagnose, and only too often very, very hard to cure, and only surgery can cure it. What do we mean by important diseases? May I lead you through some of the pleasant byways of that fountain of information (I was almost tempted to say knowledge) the Registrar-General's Returns. I can strongly recommend it to while away a dull hour or two, for it is quite as interesting to a medical man of a romantic and imaginative turn of mind as is Bradshaw or Cook to the confirmed globe-trotter, though perhaps based on less irrefutable facts.

Now the Registrar-General tells us that of a million persons every year there die of influenza 300 to 500, of cancer 1,500, of tuberculosis 1,000; these are important diseases from the State's point of view. The cases which occupy the surgeon's small purview play a far less important part, at any rate numerically. Thus of the aforesaid million per annum the mortality is from appendicitis seventy-five, intestinal obstruction sixty-seven, gall-bladder diseases fifty, prostate, I regret to say, 200. The uterus and breast account for about 300 to 400 between them. In other words, less than 1 person per 1,000 per annum dies of diseases in which major surgery plays a part. Whether this speaks well or not for surgery it is impossible to say, as we have little knowledge of the incidence of the various diseases. One thing does stand out in these statistics: that the mortality of the diseases in which we surgeons take special interest is not diminishing recently; perhaps these diseases are becoming more common—a pious hope. Hospital statistics certainly showed great improvement about the beginning of the century.

Turning back to our subject, I find that my own figures agree roughly with those of the Registrar-General. Intestinal obstruction is about six times as rare as appendi-

citis, but is about six times as fatal, making the number of deaths roughly the same for each (respective mortality 36 per cent. and 6 per cent.). So that taking end-results as a criterion of importance there is not much to choose between obstruction and appendicitis. It might be argued that obstruction is more a disease of elderly and old persons, while appendicitis cuts into the younger generation; still we find many obstruction cases in quite young persons—for example, intussusception and obstruction by bands—whilst appendicitis is certainly a more serious disease in the old and obese with doubtful hearts and kidneys.

Definition of Intestinal Obstruction

A number of conditions of very different pathology are conveniently grouped under this head. The main point they have in common is that the intestinal contents, both liquid and gaseous, are unable to pass along the bowel. The causes of this inability are many and various, and fall into two groups: mechanical and adynamic.

Mechanical.—In the mechanical type the lumen of the gut is definitely blocked by (a) impaction of mobile bodies, gall-stones, enteroliths, Murphy buttons, etc.; (b) stricture, usually malignant, also tuberculous; (c) kinking by multiple adhesions; (d) snaring of loops of gut by bands and in pouches such as internal herniae; (e) twisting or volvulus; (f) telescoping or intussusception. In the last three groups we must expect to find interference with the blood supply in the affected loop of gut, so that gangrene will usually take place within a few hours or days, according to the tightness of the obstruction. Gangrene is the most serious complication of obstruction, and in the varieties mentioned is almost inevitable unless diagnosis be speedy and treatment prompt.

Adynamic.—Less common, except after operations, is the condition in which the bowel, without any mechanical block, is unable to pass along its contents, and which is known as adynamic ileus or simply ileus. Post-operative ileus is not uncommon in varying degrees after abdominal operations, especially where infection is already present—for example, severe appendicitis. The exact nature of the affection is not always apparent. Most cases clear up, and those patients that die generally have a fibrinopurulent peritonitis, so that the probability is that such cases are in fact different degrees of not well-circumscribed peritonitis which either by the congestion and oedema of the gut prevent its action or by producing bands of lymph do actually obstruct the bowel mechanically, in which case, of course, the affair belongs to the group of mechanical obstruction, at any rate in part. The task

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in post operative cases of distinguishing ileus from mechanical obstruction is often very difficult, and the decision as to whether or not to reopen the abdomen may be an awkward problem. Apart from post-operative conditions, pure ileus is not at all common, and is most often found as a terminal state of renal failure whether from a granular contracted or congenital cystic kidney. On one occasion I operated on such a case where there was great distension of the gut, but no mechanical obstruction was found; post mortem, both suprarenals were destroyed by haemorrhages.

Aetiology

There is not much to say about this from a practical point of view. One-third of the cases are due to cancerous stenosis, the origin of which is still veiled in mystery. Intussusception accounts for less than a quarter of the cases, and concerning the usual type, that of small infants, there is still a good deal of uncertainty as to the connexion with colitis and enlarged Peyer's patches, which may act in the guise of polypi and get drawn down the bowel, forming the apex of the intussusceptum. Of course true polypi, whether innocent or malignant (usually the latter), as well as inverted Meckel's diverticula, do actually form the point of origin. Gall-stones large enough to cause obstruction never, I think, come down the common duct, but always ulcerate their way into the duodenum. Not that the common duct is not sometimes large enough to permit the passage of such stones, but because such large common ducts, which occasionally attain the size of a melon, are caused by some block at the lower end which makes it impossible for a stone to enter the bowel in this way.

Bands causing obstruction are in my experience far more commonly due to appendicitis than to any other cause. I found that out of fifty-four cases of obstruction by bands thirty-four were definitely of appendicular origin, and of these thirteen developed with an attack of appendicitis; in other cases appendicitis was probably responsible but could not be proved guilty. Tuberculous glands and peritonitis account for a few more, and gynaecological affections and operations for an occasional case, though hardly as often as might be expected, for the gynaecologist has about the worst place for producing obstruction, owing to the way in which the small gut hangs into his field of operation—the pelvis.

Varying Degrees of Severity

The main factors in relation to severity are: the rate at which obstruction becomes complete, especially as regards the passage of flatus along the bowel. Thus a slowly growing annular cancer of the bowel takes a long time to produce any symptoms at all. The lumen, which is normally one to two inches wide, can be narrowed to something like one-half to one-quarter of an inch, at any rate in the small and upper part of the large gut, without any notable effect on the patient. On the other hand, when the intestinal current is suddenly cut off, as by an impacted gall-stone, snaring of gut by a band, a volvulus, or an intussusception, immediate symptoms are produced, though it is hardly possible to separate the effect of pure block of lumen by impacted gall-stone from the effect of obstructed lumen combined with pressure on vessels and nerves, as in the last three types. Further, symptoms when present may be intermittent. This is common in cases of stenosis (usually cancerous), presumably because some less fluid constituent of the intestinal contents temporarily blocks the small opening remaining, but ultimately passes on with relief of symptoms. The same thing may happen when a gall-stone is impacted in

the bowel with temporary relief, and occasionally after several periods of alarm and relief the stone may be passed per rectum and the patient be cured by nature—a termination so rare that one dare not look for it to happen. We have, then, these varying types: the acute with sudden onset and severe symptoms where there is clearly some abdominal crisis; the intermittent, which may also come on sharply, but while the medical attendant is making up his mind the condition ameliorates and he temporizes unwisely instead of taking definite steps to confirm or confute the provisional diagnosis of intestinal obstruction; and lastly, the sort which in the early stages only suggests some vague departure from the normal in the abdominal functions, generally covered by the euphonious term "dyspepsia," but which later, if accurate diagnostic measures be not taken, will turn into a sharp attack of definite obstruction.

To the last variety the term "chronic" is often applied, which is a bad term, and liable to lead to unnecessary delay in diagnosis and treatment. I must confess I do not like the term "chronic" obstruction, for in these cases, by the time symptoms are sufficient to warrant an approximate diagnosis, I have always found that the condition of the bowel above the obstruction as regards distension and congestion rather deserves the name "acute" than "chronic." In fact, I regard obstruction somewhat as the bargee regarded his beer. You will no doubt remember that this simple critic recognized that some sorts of beer were better than others, but considered that none was bad. So I perceive that some obstructions are more acute than others, but none are truly chronic.

Factors in Death from Obstruction

There are two possible main factors in the downward course of a case of intestinal obstruction: first, depression from dehydration; secondly, sepsis and toxic absorption.

It is a well-known fact that, other things being equal, the higher the obstruction in the intestinal tract the more rapidly fatal it is, and there can be little doubt that it is the loss of a large absorbent area and starvation of the tissues as regards water and salts, especially chlorides, that is responsible for this rapidly fatal depression. At one time a fairly good case seemed to have been established for the action of toxic products in the obstructed portion of the gut, but this idea appears to be losing ground, and in practical surgery there seems to be little or no evidence of any great toxicity of the fluid, for in doing resections and anastomoses in these cases one cannot avoid fouling the surroundings to some degree, and yet healing is usually good if the patient be not too depressed to rally from the operation. Moreover, the fact that high obstruction is more rapidly fatal than the low variety, in spite of the more offensive character of the intestinal contents in the latter, is a fairly practical proof that it is not the absorption of toxic materials from the obstructed bowel into the circulation which does the harm, but the deprivation of valuable foodstuffs, water, salts, bile, perhaps hormones, which are essential to the well-being of the patient.

Another factor is sepsis in the shape of peritonitis, when portions of the gut have been badly strangulated and become gangrenous, or have given way above the obstruction from ulceration and over-distension, as sometimes happens in cases of obstructive cancer of the colon.

Reasons for Persistent High Mortality

Several points are to be noted in this connexion. The initial lesion of an obstruction varies enormously in severity, and may be far more lethal than any of the

peritonitic emergencies—for example, appendicitis, acute cholecystitis, perforation of peptic ulcer—with the exception of haemorrhagic pancreatitis. After all, the start of an obstructed or fulminating appendicitis, or even the perforation of a peptic ulcer, is hardly in the same class as a mesenteric thrombosis, a hernia through the foramen of Winslow or diaphragm, or a volvulus of the whole small intestine, where the prospects, however early diagnosed, are nearly hopeless. Obstruction cases, even the least severe, are on a large scale, and need wider laparotomy and more handling than do any but most exceptional cases of appendicitis. Another, and I think the most important, factor is the greater difficulty in making a diagnosis at an early stage, or even sometimes in realizing that an important and urgent condition has arisen which may need operation at the earliest moment.

The acute peritonitic abdomen is not often left long without surgical attention, and the same is true of the acute haemorrhagic abdomen (ruptured ectopics, ruptured spleens), for the tenderness and guarding in the one type, the pallor and prostration of the other, are noted at once. Obstruction is far more obscure in its objective signs, and depends largely on its symptoms for diagnosis. We modern materialists are perhaps too much inclined to seek for signs and find them not. How often do we hear the cheerful remark, "The abdomen is not rigid," as if all was well!

Diagnosis

The following signs and symptoms call for consideration: pain, vomiting, constipation, shock, state of abdomen, hernial rings, rectum, and, lastly, x-ray investigation.

Pain in the abdomen will always be noted, but of greatly varying intensity, from what is hardly more than discomfort or indigestion, as one finds in slowly narrowing stenosis, to acute, agonizing pain, doubling up the patient like a renal or biliary colic. At first intermittent and colicky the pain tends to become constant. We must try to distinguish it from biliary and renal colic by the absence of radiation to shoulder and testis respectively. Nor must we forget that there are other sorts of bowel colic besides that due to obstruction, such as lead poisoning and tabes; nor must we, finally, fail to realize that a patient with lead poisoning or tabes may also have an intestinal obstruction, and that it is better to open the abdomen of a patient with a gastric crisis than to leave unopened a tabetic with obstruction, though equally galling to the pride of the diagnostician. I have known of instances of both these unfortunate episodes. In old people pain is often slight.

Evidence of Stoppage of Intestinal Contents

Since the intestinal contents are unable to pass the point of obstruction two results naturally follow: (1) The fluids secreted by the upper digestive tract, stomach, liver, pancreas, etc., rapidly accumulate, regurgitate into the stomach, and are vomited. (2) Although after obstruction is established the bowel below may be emptied of its contents, there will shortly be cessation of passage of faeces and, what is more important, of flatus.

Vomiting.—This will vary in character and urgency with the position and rapidity of onset of the obstruction. When the block is high up in the jejunum there is a smaller capacity for holding the upper secretions, bile, etc., and also a smaller absorbent surface, consequently vomiting sets in early and copiously, altering from gastric contents to bile, semi-digested intestinal content, and finally offensive brown liquid, which is, however, not faecal in character, and the patient, unless relieved, dies

rapidly of dehydration and starvation. Where the obstruction is low down—for example, in the sigmoid—a different picture obtains. Here, owing to the larger capacity of the bowel above the block and its greater absorbent surface, vomiting comes on much later, sometimes not for days, and does not attain for some time the urgency noted in the more acute types. It is in this group that, after a series of vomits gradually deteriorating in character, we ultimately get the true faecal vomit—that is, liquid faeces are vomited. This sign means that obstruction has been present for some time, but it also means that the obstruction is low down, and patients with faecal vomiting are often not such bad risks as those with less offensive vomits but where the obstruction is higher up. After all, quite a number of patients with faecal vomiting recover.

Constipation.—As mentioned before faeces may be passed shortly after the onset, but it is the inability to pass flatus, though feeling that its passage would give relief, that is the important sign. When in doubt the administration of two enemas in succession is helpful: if there is no flatus with the second there is probably an obstruction.

Shock.—This is variable, and in the earlier stages very often slight. One must not expect profound shock in most cases till some time has been lost. Blood pressure is seldom lowered in acute abdominal conditions, with the exception of internal haemorrhage (ruptured ectopic), unless the patient is so badly depressed as to be practically moribund.

State of Abdomen.—In a large number of early cases examination of the abdomen reveals nothing, but yet such negative evidence may be valuable. It must be recognized that a soft, flaccid, even hollow abdomen with no tenderness is quite compatible with a severe degree of obstruction. In fact, when associated with abdominal pain which increases and remits, with rising pulse, an urgent green vomit becoming brown, a hollow-eyed, anxious expression, and subnormal temperature, there is no distension or rigidity or tenderness, it is clear that the affair is even more grave, for there is surely obstruction present. Respiratory movements of the abdomen are not affected except where the distension is great, as in volvulus, or later when a terminal ileus and peritonitis sets in. Distension is seldom great in the early stages except in volvulus. In the later stages of so-called chronic obstruction, when it is becoming definitely acute, distension may be great. Local distension is not so common, but when present is a valuable sign; a tender, fixed, resonant swelling in some part of the abdomen may indicate a loop of gut snared under a band or in a para-duodenal hernia. In one instance the pyloric end of the stomach had become strangulated in a diaphragmatic hernia, and the fundus formed a resonant tumour in the epigastrium. Visible peristalsis is not an early sign, and is more often seen in the subacute forms. We must distinguish the normal peristalsis seen through the thin abdominal wall of old persons: in true visible peristalsis a loop of gut erects itself into notice with accompanying colicky pain.

Tumour.—Intussusception is the only one of note. Cancerous tumours are occasionally but not often palpable; the palpable sort in the caecal region seldom produce obstruction.

Hernial Rings.—I need hardly refer to this classical source of error except to remind you that in a large, fat woman a small femoral hernia will readily escape notice. Local pain is often absent, and the mortality for herniotomy is only about one-third that of a laparotomy for obstruction.

Examination of the rectum may reveal a malignant stricture and point to an inguinal colostomy—less severe than a laparotomy. Finally, the presence of blood and mucus on the examining finger may mean intussusception.

X-Ray Examination

This may be of great help, and may be employed in at least three ways. (1) Barium meal, and observing at intervals of six to twenty-four or forty-eight hours whether there is any hold-up of the barium or any narrowing. (2) Barium enema, which may be used to show obstruction in the colon. (N.B.—These methods are only suitable for the less acute types, and one must remember in locating the point of obstruction that the opaque meal may be held up a long way above the true point of obstruction by the accumulation of liquid and gas above.) (3) Perhaps the most valuable method is the plain x-ray of the abdomen, which will show coils of distended gut above the obstruction and levels of fluid in the obstructed coils when the patient is placed in an approximately vertical position. This plan should be employed as a routine in doubtful cases, because it does not upset the patient, takes little time, and may save hours of delay—for example, when trying to decide whether a colic is biliary or renal or due to obstruction.

Treatment

The cardinal rules are an early operation, a quick operation, or quick in and quicker out, but with the proviso that the obstruction must be adequately relieved. Thus in a case of matting by adhesions we must take care that some outlying but important band is not left undivided. Further, greatly distended gut should be relieved of its contents on the table. The simplest plan is by making a small hole in a distended loop held well below the laparotomy; several feet of gut can be emptied in this way, and three holes will suffice to empty most of the small intestine. When the gut does not contract well after emptying, one should think of making an ileostomy with a sewn-in catheter; this is a valuable help in bad cases, since not only can gas and fluid escape but saline and glucose can be passed in through the same tube. Where distension is very great, so that the site of obstruction is hard to find, it will probably be best to enlarge the laparotomy and eviscerate all distended gut under warm towels; the time saved by this, as against groping about vaguely, more than makes up for the extra shock of evisceration. Where many adhesions are divided so that raw surfaces are left which cannot be oversewn, and there is considerable likelihood of more adhesions forming, it seems a good plan to pour in liquid paraffin, two to four ounces—at least, good results have followed this plan. It is often necessary to open and drain the gut in order to reduce a snared or twisted loop—for example, in volvulus. A small puncture will let out volumes of gas, and the loop of gut from being like a blown-up motor tyre will become as soft and amenable as a piece of tripe unless gangrene or incipient gangrene has developed.

The Caecum.—It is a sound old rule to regard the caecum as the cardinal landmark of the operation. For not only does a full, distended caecum point to an obstruction lower down, but an empty, contracted caecum is the proper place to start investigation for the source of obstruction in the small gut. Where the abdomen is filled with numerous coils of distended small gut it is little use to hunt these up and down, for such treatment only causes further distension; but if the caecum is located the contracted small gut above it may be quickly and easily followed up to the site of obstruction, doing little harm to the bowel and saving much valuable time

under conditions where saving time may well be saving life.

Resection of gut should be avoided at the primary operation if possible, but may be urgently necessary when gangrene is present. Whatever method is practised a high mortality is inevitable. For small gut after resection an end-to-end anastomosis and closure will be best, as with the simpler method of draining the ends on the surface there is apt to be too much loss of vital fluids for the patient to stand it. In the colon gangrene is not common, except in cases of volvulus, and here the best plan will be to bring the two ends to the surface after resection and fix with Paul's tubes; later the spur is crushed with an enterotribe. One should make every effort to reduce an intussusception, even to bursting the outer layer before resecting it, for it frequently happens that at the last moment the intussusceptum slips back and the probable mortality drops from 90 to 15 per cent.

In the colon, except in some cases of volvulus, the operation will usually finish as a colostomy: the question is where to do it. A caecostomy is the most usually suitable, either because there is too much distension to find the site of obstruction easily or there is a removable growth felt lower down the colon. If *per contra* the obstructing growth is irremovable one must consider whether a short circuit around it is feasible; or, if a colostomy is to be done it should be as near the growth as is convenient in sigmoid or transverse colon to avoid the damage to the skin from the liquid contents of the caecum.

Prevention of Recurrence

The careful division of bands and closure of holes and internal herniae is an obvious precaution. Ordinary infantile intussusception seldom recurs, though I have seen it happen. When the intussusception is due to a polypoid growth inside the gut or invaginated Meckel's diverticulum removal is essential. Volvulus is another problem; the ideal method is to resect the greater part of the loop, making an end-to-end anastomosis with the few inches left at each end, but in few cases is it feasible, either from the bad state of the patient or the gut. A small enterostomy in the loop serves to prevent its twisting, and also assists in keeping the bowel drained. I have found this method useful in volvulus of whole small intestine, though it has the theoretical weakness of making an internal aperture through which coils of gut might slip and become strangulated.

Conclusion

Intestinal obstruction is a condition which, unless treated surgically, is almost inevitably fatal. One can safely say that of the patients who survive at least 99 per cent., and probably more, would have died without surgery. I have met with cases of gall-stone obstruction where the stone has passed, of volvulus which untwisted (but afterwards recurred), of intussusception which reduced itself. I have seen one case of each such recovery amongst between 200 and 300 obstruction cases, so that the hopes of natural cure may be regarded as negligible.

There are other important groups—gastric cases, goitres, etc.—where one must admit there is scope for quite different lines of treatment—medical, surgical, x ray, radium, etc.—and where the main point is to determine whether and when it is wise to change from one line of treatment to another. But in the case of obstruction once the diagnosis is made, and even where there is much suspicion, we must consider that surgery affords the only rational line of treatment. In fact, the disease is mechanical and the treatment should also be mechanical, and only by making our diagnosis earlier can we hope to get better results.