

THE OPERATIVE TREATMENT OF INTESTINAL OBSTRUCTION.

T H E S I S

ChM
Submitted for the ~~M.D.~~ Glasgow.

by

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INTRODUCTION.

The subject of Intestinal Obstruction is one of the widest it is possible to hit upon in the whole field of Surgery. This is because obstruction can be brought about by such a variety of conditions, each of which can be described as a definite surgical entity, having perhaps a definite sign or symptom peculiar to itself and depending upon the Pathological condition at work in each particular case.

Notwithstanding the great amount of attention focussed on this subject by surgeons who are actively engaged in surgical practice, the results of the operative treatment are still, to put it mildly, bad. The mortality figures for all types of obstruction are still in the neighbourhood of 40%, a figure which must be considered far too high, and much in excess of the ideal of leading surgeons, who affirm that nine cases out of ten should be successfully operated upon.

While the mortality percentage for all cases is unquestionably high, there are two conditions, namely: Strangulated Inguinal and Femoral Hernia, which show a much lower figure, 15% to 20%.

One of the chief causes of the high mortality figures which the combined statistics show is certainly delay in operation./

operation. The patient often comes to the surgeon with the condition too far advanced - faecal vomiting, well marked abdominal distension, observable intestinal peristalsis - to give him a fair chance of recovery. That the time of operation has a marked bearing on the chance of ultimate recovery is well shown by the fall of the mortality percentage for one type of obstruction (Intussusception) from 40% to 9%, over a period of twenty-five years. Such improvement is largely ascribed to the earlier time at which operation is now performed for that particular condition. Cases of this type are now usually operated upon within twenty-four hours of their onset. On the other hand, in obstruction due to gallstones, operation is commonly delayed until between the third and fourth day or even later, with the consequence that the mortality percentage is still over 50%.

The secret then of the successful treatment of Intestinal Obstruction, from whatever cause, is early operation, and it is now almost a surgical axiom that the longer a patient, who is suffering from obstruction, lives before operation, the shorter will he live after it. It will, therefore, be the aim of this paper to emphasise the points that help towards an early diagnosis in each particular type of obstruction, and to describe the operative treatment suitable to each particular case.

CLASSIFICATION.

In regard to the classification of Intestinal Obstruction it is a general rule first of all to apportion a case of to one/three Clinical types, viz.

I Acute or Sudden Obstruction.

II Chronic or Gradual Obstruction.

III Acute superimposed on Chronic Obstruction.

Having done this, it is necessary to group the case according to the Pathological condition at work. Here again there are three main divisions,

I Adynamic.

II Dynamic.

III Mechanical.

Some authorities do not agree with this classification which separates Adynamic and Dynamic groups, but the late John B. Murphy, of Chicago, was insistent that they should be kept separate because they are entirely different in type.

In Adynamic Ileus the obstruction is due to an atonic paralysis of the muscular coat of the bowel. It may be brought about by the following conditions:

I Operations on the Mesentery.

II Prolonged Strangulation.

III Spinal Cord lesions.

IV Afferent nerve lesions.

- V
Reflex (a) Strangulated Omentum.
(b) Hepatic Calculus.
(c) Renal Calculus.
(d) Ovarian Compression.
(e) Diaphragmatic Pleurisy.

- VI
Septic (a) Local Peritonitis.
(b) General Peritonitis.
(c) Embolism.
(d) Thrombosis.

VII Uraemia.

VIII Prolonged use of drugs.

Dynamic Ileus, on the other hand, is brought about by the definite spasm of a section of the muscular coat of the bowel, and its causes are two in number:

I Chronic Lead Poisoning.

II Tyrotoxicon Poisoning.

Mechanical Ileus is due to a definite Pathological lesion, which may be:

- (Inguinal Hernia.
Femoral Hernia.
I External (Umbilical Hernia.
Ventral Hernia.
Peritoneal Pockets.
Diaphragmatic Hernia. Faecal Impactions.
Adhesive Bands.
II Internal Diverticulæ. Foreign Bodies.
Volvulus.
Intussusception.
Neoplasms.
Cicatricial Contraction.

In classifying obstruction due to Hernia of any type,

one/

one must group cases into two further sub-divisions:

I Those in which the Intestinal flow alone is obstructed - Incarceration.

II Those in which there is present, in addition to the above, interference with the blood and nerve supply of the herniated bowel - Strangulation.

ETIOLOGY AND PATHOGENESIS.

Taking the foregoing as a workable classification, we must then first consider Adynamic Ileus. Adynamic Ileus may be caused by operations on the mesentery. If a portion of the mesentery more than two inches in width at the margins is ligated a dilatation of the segment of Intestine supplied by it takes place as a result of the cutting off of the nerve and vascular supply. The loss of the former causing Atony and loss of Peristalsis, and of the latter loss of nourishment, followed by necrosis and gangrene.

Prolonged strangulation of a loop of gut is a lesion quite similar to ligation of the mesentery. The nervous and vascular supply are similarly compromised, and if too long an interval before operative treatment is instituted, the enervation of the gut may be so interfered with, that peristalsis will not be restored. Lesions of the Spinal Cord produce Atonic Paralysis of the Intestine by cutting off its central motor nerve supply. This is well illustrated by the meteorism which occurs in fracture of the Spinal Column in the lower Cervical and upper Dorsal regions.

Mediastinal lesions involving the efferent nerves to the intestine (Vagus and Sympathetic) may also cause a failure of Peristalsis.

In the production of Reflex Paralysis of the Intestine the mechanism is not so clearly apparent. In the case of strangulated omentum, if this is not removed, the paralysis continues until the omentum becomes necrotic, and in consequence ceases to give peritoneal and other reflexes. This is the kind of obstruction which yielded to medical treatment in pre-operative days.

In Diaphragmatic Pleurisy the inhibitory effect of the pain on defaecation sometimes produces considerable distension, which, if not released by the passing of a high rectal tube, may go on to obstruction.

In the next group of cases, namely, those coming under the heading of Septic Adynamic Ileus, the patient may have, for instance, an acute appendicitis with perforation or a perforated duodenal or gastric ulcer. As a result of the peritonitis and shock which follows a suspension of the bowel peristalsis occurs. The combination of these two factors, together with the absorption of toxins, which takes place from the intestine itself, rapidly produces a fatal issue, unless operative treatment of a suitable kind is instituted.

Embolism and Thrombosis of the mesenteric vessels also produce a paralysis of the bowel. As soon as the blood supply is interfered with the wall of the gut becomes readily and rapidly invaded by organisms which pass through to invade the Peritoneal/

peritoneal cavity. The extent of the gangrene of the bowel varies within wide limits - from an annular slough to several feet of bowel - while in one or two outstanding cases the whole of the small bowel has been gangrenous.

The causes of Embolism and Thrombosis are numerous. In the great majority of cases of Embolism endocarditis is present. Atheroma of the mesenteric vessels has occasionally been found. In the cases of Venous Thrombosis the Thrombus may be Primary or Secondary. It may originate in the vessel wall or be secondary to a Portal Thrombosis. Primary Thrombosis has followed upon Enteritis and upon Intra Abdominal suppuration. Secondary Thrombosis has occurred as a result of Cirrhosis of the Liver, Pylephlebitis and Syphilis.

Of Dynamic Ileus it is sufficient to state that it is due to the action of the drugs concerned - lead or Tyrotoxicon. It is characterised by the occurrence of colic, due to a spastic contraction of the bowel at one or more places. The contraction of the segment involved may be so great that the bowel resembles a fibrous cord

ILEUS.

Mechanical Ileus. The conditions which most frequently produce mechanical obstruction of the bowel, ~~and~~ if we exclude Intussusception, are the external hernias. Inguinal Hernia is the most common of all the types, although the femoral/

femoral variety is more common in women. Obstruction from a Hernia may be brought about by one of two conditions - Incarceration or Strangulation. The former is usually produced slowly by the retention of more and more faecal content in the herniated bowel. The latter is produced acutely; very often by the sudden increase in amount of the herniated bowel, which might be brought about by a sudden violent physical effort. As a result, the bowel becomes nipped at the neck of the sac, and its vessels occluded. Strangulation then ensues. An Umbilical Hernia is a constant source of danger to its possessor, usually a middle-aged woman, who has borne many children. The many pockets and diverticulae which it contains form a ready snare for any loop of bowel which might slip into them.

The serious feature in Femoral Hernias is the inelastic boundaries formed by Poupart's and Gimbernat's ligaments. A knuckle of bowel can be very easily nipped by these unyielding structures.

Internal Hernia. These of course are rare compared with those of the external type. They occur at the following points:

I. Right Duodenal Hernia bounded in front by Superior Mesenteric Artery.

II. Left Duodenal Hernia bounded in front by Inferior Mesenteric Vein.

In these two types it is found that the obstruction is due, not so much to the actual compression at the neck of the sac, as to a twisting of the loop of bowel involved in the Hernia.

III. Hernia into the Foramen of Winslow.

This form of Hernia is extremely rare, only three being chronicled in the whole literature of Internal Hernia. It can only occur when the opening into the lesser sac is abnormally large, and when a marked degree of Visceroptosis is present.

IV. Hernias through abnormal openings in the mesentery.

These openings may be congenital or may be due to operative trauma.

V. Pericaecal Hernia.

The most important of these occurs into the Retro Colic fossa lying behind the Caecum and Ascending Colon.

VI. Intersigmoid Hernia.

Hernia between the folds of the mesentery of Pelvic Colon.

VII. Diaphragmatic Hernia.

The hernial openings are most often due to trauma, but occasionally occur as a congenital defect in the diaphragm, and are then notable for the small amount of disability which they sometimes produce. Men have been passed into the Army as Category AI suffering from congenital diaphragmatic hernia/

hernia.

VIII. Strangulation by adhesive bands is comparatively common.

These bands are of three types.

(a). Congenital Malformations. Very often developed from remnants of the Vitello-Intestinal Duct.

(b). Bands developed in connection with enlarged mesentric glands or from adhesions resulting from some previous intra abdominal inflammation such as appendicitis. The band may be long or short. The shorter the band the more intense the obstruction. Usually bands are single but they may be multiple.

(c). Meckel's Diverticulum - or long appendix. Either of these may act like a band and cause obstruction.

Another cause must now be dealt with which is very common in children.

This is:

IX. Intussusception which forms 40 per cent. of the total number of obstructions if we exclude the Strangulated hernias. In a series of 55 cases of acute obstruction in children operated upon by Peterson^I of New York, 46 were due to Intussusception, and of this number 39 occurred in children under one year. Of the remaining seven, the ages varied from 20 months to 8 years. The cause of the condition is very often some/

some intestinal disturbance such as an enteritis or a small polypoid growth which cause an irregular contraction of the bowel wall which pushes or pulls upon a portion of the inflamed and swollen mucous membrane towards the lumen of the gut just beyond. This acts as an irritant which sets ^{up} further reflex contractions of the bowel wall similar to that by which food is ordinarily passed along. According to Perrin and Lindsay^{II}. the determining factor is the production of the equivalent of a foreign body in the Intestines. The foreign body effect is provided by the swelling of the pre-existing lymphoid tissue. The anatomical and age distribution of the lymphoid tissue in the gut corresponds with the anatomical and age incidence of primary Intussusception. They further state that the factor which provokes this swelling of the mucous membrane is a gastrointestinal disturbance, and that the secondary maximal incidence which occurs between five and nine months is accounted for by this fact.

X. Volvulus or twisting of the bowel round its mesenteric axis may occur at any portion of the Intestinal Canal which is supported by a mesentery. It most commonly involves the Sigmoid Flexure (75%). Next in order of frequency comes the Caecal region and after that the Jejunum and Ileum. It most often occurs during the prime of/

of life and is four times more common in men than in women. As a rule there is a definite history of chronic constipation. In addition there is usually some anatomical abnormality present. In the case of the Sigmoid this is sometimes represented by a mesentery which is very long and with a narrow base. In other cases it may be brought by inflammatory adhesions which cause approximation of the two ends of the loop. As stated above, chronic constipation is often an important causal factor. In this type of case the over-loaded Sigmoid loop hangs down into the pelvis and drags on its mesentery. This over-loading of the loop is quite often the cause of strong irregular contractions of the gut in an effort to expel its contents. As a result of this the affected loop becomes twisted. The twist will vary in degree from half a turn to one and a half turns. The twist most usually follows the direction of the hands of a watch. That is to say the upper leg falls downwards and forwards in front of the lower leg.

The same holds good for volvulus of the Caecal region. In this type the caecum and ascending colon are often supported by a mesentery directly continuous with that of the small gut. When the small bowel is involved it is in most cases due to an adhesion band fixing firmly one or more loops of bowel together at their bases.

XI. Neoplasms of the Intestine produce mechanical Ileus. The obstruction only becomes acute after a varying period of chronic obstruction. On account of the fluid nature of its contents, the lumen of the small bowel may be reduced to the size of a crow quill before acute obstruction is brought about. The growth most usually takes the form of a Columnar Celled Adeno-Carcinoma. It either grows round the bowel, gradually narrowing its lumen by the contraction of the tissues which it produces, or it projects into the lumen of the bowel in the form of a large cauliflower mass, which obstructs either by its size, or by producing an Intussusception.

XII. Ulceration of the bowel from any cause - Tubercular, Dysenteric, Syphilitic, Stercoral - may also produce acute obstruction after a varying period of Chronic Obstruction.

XIII. Faecal Impaction. While this could possibly occur at any age, it most usually occurs in old, debilitated and neglected individuals. A very long history of Chronic constipation is always given, together with a great carelessness in regard to bowel function.

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS.

It will now be necessary to consider the signs and symptoms of acute Intestinal Obstruction in general terms, then to follow, by pointing out the special points for diagnosing the different causes and sites of the obstruction, and to conclude by discussing the differential diagnosis from other acute abdominal conditions.

SIGNS AND SYMPTONS.

I. Pain. At the commencement the pain of acute intestinal obstruction is severe, more particularly around the Umbilicus. In addition, when the small bowel is the segment actually involved, severe back-ache is sometimes complained of. The pain is essentially "Referred" pain and comes through the nerve supply of the obstructed gut and nerve supply of abdominal wall (muscle and skin) via the corresponding spinal segments.

II. Collapse. The patient is obviously "shocked" from the commencement. Temperature sub-normal, pinched, anxious expression and sometimes a fast pulse. In the later stages the temperature is elevated, but this is a sure indication of the development of Peritonitis.

III./

III. Vomiting. The vomiting in intestinal obstruction is persistent and intractable. It can only be temporarily relieved by lavage of the stomach and starvation. The higher the obstruction the sooner does the vomiting commence. At first the vomitus is composed of stomach contents, then bile, and latterly becomes faeculent. It is, however, only truly faecal when a fistulous track is present between stomach and large bowel.

IV. Peristalsis. When seen, this is of course Pathognomic of the condition. It also indicates that the obstruction has been present for a considerable time. If the obstruction is high up in the small bowel visible Peristalsis may be absent, even when obstruction has been present many hours. In very obese patients it may also be absent.

V. Pulse. In some cases the pulse may show no variation from the normal in the early stages of the condition, and from the point of view of value for an early diagnosis, is too erratic in its behaviour.

VI. Thirst. This is always severe. The higher up the obstruction the more severe the thirst.

VII. Distension. This occurs gradually, and is characterised by the fact that the abdomen remains supple and moves on respiration. It varies with the site/
(16)

site of the obstruction. The lower the site of obstruction the more manifest the distension.

VIII. Constipation. Complete Constipation, that is to say inability to pass either flatus or faeces, is the most characteristic and important symptom of obstruction. It may be said to exist if on giving two large turpentine enemas, within twenty-four hours the second one comes back clear and without any passage of flatus. Its presence or absence should be made out as early as possible. It should be noted that there is always the possibility of the passage of one normal stool after the onset of obstruction and then no more.

The intensity of the above symptoms and signs will, of course, vary with the site and the cause of the obstruction. When this is high up in the small intestine, acute symptoms supervene early. Vomiting commences within an hour or so, and is frequent and violent. Initial shock and pain are severe, while distension is not marked. In obstruction low down in the Ileum the symptoms are less severe. Shock and pain still remain marked, but vomiting is later in its onset, and it is sometime before it becomes faeculent. In large bowel obstruction pain is not marked except in some cases of volvulus or Intussusception. Vomiting is late in appearing/

appearing and is nothing like so severe as in obstruction of the small gut. Distension which is marked from the outset is here the most pronounced sign.

Acute Intestinal obstruction has got to be diagnosed from the following conditions:

- I. Perforated Gastric Ulcer.
- II. Perforated Duodenal Ulcer.
- III. Appendicitis.
- IV. Acute Pancreatitis.
- V. Ruptured Tubal Gestation.
- VI. Biliary, Renal or Intestinal Colic.
- VII. Twisted ^a Pedicle.
- VIII. Cholecystitis.

From the inflammatory conditions it is distinguished by the absence of rigidity of the abdominal wall and by the greater frequency and persistence of the vomiting which tends to become faeculent. Also the temperature in early acute obstruction is invariably subnormal, while in the inflammatory conditions it is most usually raised except immediately after the perforation of a gastric ulcer when the temperature may be subnormal from the degree of shock produced.

In Acute Pancreatitis the pain is confined chiefly to the epigastrium and is much more intense than in obstruction.
The/

The patient is very often cyanosed in this condition and enemata will produce large fatty stools which will of course rule out obstruction. Ruptured Tubal Gestation is characterised by the increasing pallor of the patient indicating a severe haemorrhage internally. In cases which have gone on some time this may be further emphasised by Air Hunger. The pulse will be fast (120-130) thready and increasing in rate. There will be a history of having missed one period and the Vaginal examination may reveal boggy in the Posterior fornix from the accumulation of blood and blood clot in the pouch of Douglas. The flanks will yield a dull note on percussion and the dullness will be of the moving variety. An enema will give a faecal result.

Biliary and Renal Colic are distinguished by the radiation of the pain. The vomiting in either of these conditions lacks the persistence of that in obstruction and never becomes faeculent. In neither condition is there distension or complete constipation, an enema immediately producing a satisfactory motion. An examination of the Urine will in most cases clinch the diagnosis in Renal Colic - the presence of Blood cells, Oxalate or Uric Acid crystals pointing to the latter condition. In Biliary colic there will most usually be a history of previous indigestion, and/

and of dislike of fatty foods. There may also be a history of Jaundice and the passage of light coloured stools.

Gastric crises may cause difficulty (tabetic patients have in the past been subject to laparotomy) but a routine examination of the eyes for reaction to light and power of accommodation together with a testing of all the reflexes should exclude this tragedy.

From the above it would therefore seem justifiable to diagnose acute obstruction in a patient showing the following signs and symptoms:

I. Complete Constipation as proved by the giving of two turpentine enemias in the first twenty-four hours with the second giving no result either in the form of flatus or faeces.

II. Continuous Vomiting tending to become faeculent and unrelieved by either stomach lavage or starvation.

III. Abdominal Pain more particularly in region of Umbilicus,

IV. Absence of Abdominal Rigidity.

V. Subnormal temperature.

VI. Absence of Cyanosis.

VII. Absence of Air Hunger.

we will now proceed to consider the special points in
the/

the diagnosis of each particular form of obstruction.

External hernia. In obstruction by external hernia there will be the presence or history of a hernia to guide one. The hernia is usually quite easily made out with perhaps the exception of a small Femoral Hernia in a fat patient or a Richter's hernia in any of the types. The latter in fact is very rarely diagnosed per se and it is only the occurrence of a local or general peritonitis that leads to the condition being found out. This is due to the fact that in a strangulated Richter's Hernia the two cardinal symptoms of obstruction (continuous vomiting and absolute constipation) are absent in the early stages of the strangulation and only make themselves evident when the wall of the gut is paralysed by the supervention of the General Peritonitis. It is well to remember, more particularly in connection with the treatment of a Richter's Hernia, that the points of escape for the intestinal content are almost microscopic in character and are seldom larger than a pin head.

Intussusception. In the first place this most usually occurs in children. As a general rule the child has been perfectly fit and well until seized suddenly with severe abdominal pain indicated by a fit of screaming and pulling up of the legs. The pain is intense and corresponds with the contractions of the gut. The child is considerably shocked/

shocked during the duration of the pain but quickly recovers when this passes off. The time of the recurrence of these attacks will vary from a few minutes to an hour or more, the child in the meantime appearing to be quite normal. At a time varying with the site of the invagination blood and mucus appear in the stools. This occurs in 90 per cent. of cases and combined with the presence of a Tumor in the abdomen is pathognomonic of the condition. Absence of complete constipation in a child does not rule out of court intussusception if the other symptoms and signs are present. Tenesmus may be present if the apex of the invagination approaches the Rectum. In some cases which have been neglected the apex has protruded from the Anal Canal but this I have never personally seen. Intussusception has to be diagnosed from;

- I. Simple Colic.
- II. Colitis.
- III. Rectal Polypus.
- IV. Prolapsed Anus.
- V. Henoch's Purpura.

In Colic the shock is nothing like so severe. There are not the typical bouts of pain as in intussusception and there is an absence of blood and mucus in the stools.

In/

In Colitis there will usually be a history of diarrhoea for some considerable period, and the child consequently in a debilitated condition. In addition there is a large amount of faecal matter passed with the blood.

It is only necessary to examine the patient to distinguish the condition from a Prolapsed Anus. From Henoch's Purpura the diagnosis is more difficult, but search must be made for the presence of purpuric spots and multiple Arthritic involvement. The age of the child in this condition is usually in advance of that in Intussusception, the youngest child known to have it definitely being four years.

Obstruction caused by Volvulus is very often not diagnosed before the abdomen is opened. The condition is chiefly met with in adults, and is much more common in men than in women. There is usually a history of Chronic Constipation of years' duration. The symptoms vary somewhat with the site of the twist, but in a typical volvulus involving the pelvic colon, the obstruction comes on suddenly, and is accompanied by a great amount of Colicky pain, chiefly in the left Hypogastrium. Distension, which comes on early, and is most pronounced, is the characteristic feature/

feature of this condition. The loop involved may be so greatly distended as to occupy a considerable portion of the abdomen, and may press upon the diaphragm. Vomiting is not severe as a rule and it comes on late, but I have noticed in one case severe and distressing hiccough.

OBSTRUCTION BY GALLSTONES.

Gall Stone Obstruction is almost invariably caused by the ulceration of a large stone through the wall of the gall bladder, which has previously become adherent to the duodenum, owing to continued inflammation set up by the stone. In the literature on the subject there are only two exceptions to this rule, the stone in these cases having passed into the intestine via the ducts. The patient is usually between fifty and sixty years of age, and is more often a woman. In most cases a definite history of epigastric pain and tenderness is given, but seldom is Jaundice complained of. This latter point is due to the fact that the stones which cause obstruction do not pass down the ducts. As the stone ulcerates through to the bowel the epigastric pain becomes more severe, this being due to the local peritonitis set up by the presence of the stone. When the stone becomes impacted in/

in the intestine the pain is referred to the Umbilical region. Vomiting then becomes very marked and persistent. Shock and collapse are not pronounced at first, because the vascular and nerve supply of the gut are not interfered with.

ENTROLITHS.

Acute obstruction by Entroliths is a rarity. A prolonged history of constipation is usually given, and there is often present a degree of Visceroptosis.

In acute obstruction by bands one has to include bands formed in the following manner:

I. Stretching of Peritoneal adhesions caused by previous peritonitis.

II. Omental Bands - usually Congenital.

III. Meckel's Diverticulum.

IV. Bands formed by structures becoming abnormally attached, such as the Appendix and Fallopian Tubes.

V. Bands formed as a result of adhesions from previous operation.

It is almost impossible to diagnose with any degree of accuracy the exact cause of the obstruction in these cases/

cases before the abdomen is opened, but a history of a previous peritonitic infection would make one think strongly of bands, more particularly if the infection had been Tubercular in nature.

EMBOLISM AND THROMBOSIS.

Obstruction due to Embolism or Thrombosis of the mesenteric vessels may be either acute or chronic in character. The former is the more common variety. In this type of case the symptoms are ushered in with great suddenness. The patient complains of intense abdominal pain followed by nausea and vomiting and collapse. The abdomen becomes rapidly rapidly distended, rigid and tender. In nearly 60% of cases there are bloodstained motions passed and the vomitus itself is often mixed with blood. The diagnosis is seldom made before opening the abdomen. In order that a definite pre-operative diagnosis might be made the following conditions would require to be present: (Gerhardt)^{III}.

- I. The presence of a source for an Embolus.
- II. Copious intestinal Haemorrhages.
- III. Rapid and marked fall of temperature.
- IV. Very severe Colicky pains in the abdomen.
- V. Simultaneous or previous occurrence of Embolism elsewhere.

IV.

Amos, in reviewing the literature of the subject, considers that in cases of Intestinal Obstruction one should think of Thrombosis of the mesenteric vein as a possible diagnosis if:-

- (1) There is present a condition which would cause an increased coagulability of the blood, such as Pregnancy, Eclampsia or Thrombosis of the veins elsewhere.
- (2) Stagnation of the Portal Circulation.
- (3) Any purulent processes in the areas drained by the Portal System.

POST-OPERATIVE OBSTRUCTION.

In this type of obstruction the characteristic feature is the gradual distension of the abdomen with very little or no pain and discomfort. There is often complete absence of muscular rigidity and the temperature remains persistently subnormal. Patient is very much collapsed. In addition, of course, the knowledge of a prior operation, probably a long one, involving much handling of the bowels.

INTERNAL HERNIA.

In these cases the cause of the obstruction is seldom diagnosed before operation. The presence of the hernia is almost always in the nature of a complete surprise. There are no specific points which could lend any help towards the diagnosis, with the possible exception of an X Ray photograph, taken after the administration of a Borium meal/

meal in the case of a left Diaphragmatic Hernia, which, in most or all cases, will show the stomach in the Thorax. Pain on taking a deep breath and the hearing of splashing on auscultation might put one on guard, but they are really too indefinite to be of much help.

TREATMENT.

The diagnosis of Acute Obstruction having been made, operative interference is then the only form of treatment which can hold out any hope, and the sooner it is begun the better for the patient. The ideal operative interference should bring about:

I. The removal of the cause of the obstruction.

II. The evacuation and drainage of the distended bowel above the seat of the obstruction.

III. Dilution of the toxins already absorbed and the dehydration of the tissues made up for.

The extent of the operative interference will, however, depend to a considerable extent upon the condition of the patient. Taylor^{V.} of Dublin has divided his cases into three categories.

I. The patient is seen within the first twenty-four hours of the onset of the symptoms of acute obstruction. His general condition is good; there is little abdominal distension. In this type of case, after lavage of the stomach has been carried out a general anaesthetic is given, and the abdomen opened in the mid line above the umbilicus. The cause of the obstruction is searched for, and if possible removed. In the latter eventuality/

eventuality the abdomen is closed without drainage, and the stomach again washed out. If the cause of the obstruction is irremovable an artificial anus must be made immediately above the growth if this is in the large bowel, or else short circuited if small bowel is the seat of the disease.

II. In this category the patient is not seen until between the second and fourth days. The general condition remains good, but there is considerable distension present, together with severe vomiting, which may possibly be stercoraceous. In this type of case the operative procedure is the same as in the previous category with the addition of the following: A separate incision is made in the left rectus above the level of the umbilicus and a loop of Jejunum as high up as possible is brought out of the wound. Into this is inserted, after the manner of a Senn's Gastrostomy, a tube with the calibre of a No. 12 Catheter. The tube is brought up through the great Omentum which obviates any suturing of the bowel when the tube is removed. The wound is closed in the usual manner and the intestine is then irrigated with Sod. Bic. solution at frequent intervals through the tube. In this way the poisonous contents of the disturbed and obstructed bowel are got rid of and their place taken
by/

by a fluid containing NaCO_3 and Glucose which will tend to counteract acidosis and at the same time make up for the loss of fluid caused by the continuous vomiting.

III. In this category the general condition of the patient is bad. The abdomen is greatly distended; vomiting is continuous and stercoraceous. The pulse is fast, feeble and irregular and the patient is obviously deeply poisoned. Here the patient is quite unfit to stand a general anesthetic. His stomach is washed out and the area of the abdominal wall where incision is to be made is infiltrated with Novocain and Adrenalin. An upper Jejunum loop is sought for and brought out of the wound and a tube inserted as previously described. Siphonage of the distended coils is commenced and kept up continuously. If the patient survives, a later operation for the removal of the obstruction is undertaken.

Speaking in general terms it can be said that operative interference in acute obstruction from any cause must include lavage of the stomach before and after operation, and in severe cases drainage of the Jejunum as high up as possible. In all cases too a liberal administration of saline subcutaneously should be given and if necessary repeated at frequent intervals. The necessity for drainage/

drainage of the Jejunum is well brought out by Pringle^{VI} (Lancet, July 1923) in whose paper the following points are made:

I. The principal factor in causing death in acute Intestinal obstruction is a toxin which is developed chiefly in the duodenum and although not absorbed from normal intestine is absorbed under conditions which prevail in obstruction.

II. The toxin is almost certainly derived from protein disintegration.

III. While the duodenum is the site of maximum toxicity in obstruction, yet the poisonous substances are developed lower down in the intestine and it is probable that in the production of these toxins bacterial action plays an important role - a role which increases in importance the lower down the obstruction occurs.

It is unquestioned that the method of draining (described above) the obstructed section of the bowel in bad cases has given wonderfully good results. It is a procedure which is simply and quickly done and puts the minimum amount of strain on the patient.

The alternative to the above method of drainage, which could be termed external drainage, is internal drainage the elaboration/

elaboration of which is due chiefly to the work of Sampson Handley^{VII}. It is made use of in cases of secondary peritonitic obstruction where the bowel is first acutely inflamed and then completely paralysed by the extension of the peritonitic inflammation to its muscular walls. It may take the form of

I. Precautionary lateral anastomosis. As an example take the case of the appendix acting as a band and causing obstruction. In this case after the removal of the adherent appendix an anastomosis is made between the lower end of the Ileum above the strangulation and the caecum. A similar procedure could be applied to a strangulated hernia, the bowel a few inches above strangulation is anastomosed to bowel a few inches below obstruction. The gut of which the strangulation is in question is left in the wound which is not closed. If this method is adopted in this particular type of case the shock of an immediate resection and anastomosis is avoided. In developing his argument for the performance of internal drainage Handley points out that in cases of peritonitic obstruction the peritonitis almost invariably starts in the pelvis from the gravitation there of infective material from some higher focus in the abdominal cavity such as a perforated gastric or duodenal ulcer or a perforated appendix. The peritonitis caused in this way gradually rises/

rises in the abdomen and causes the death of the patient usually before the level of the Umbilicus is reached. As the Pelvis is first affected internal drainage is established by performing an Ileo caecostomy with the addition of a self closing Caecostomy. This latter procedure is necessary because the Pelvic Colon as well as the Pelvic Ileum is temporarily paralysed. If the peritonitis instead of being limited to the pelvis has risen higher in the abdomen it will be necessary to anastomose the jujenum to the transverse Colon and a Caecostomy done as before. The object of these operative procedures is the improvisation of an emergency Alimentary Canal above the level of the Peritonitic involvement. Compared with Enterostomy there is a considerable saving of body fluid and nutriment at a time when the patient is in urgent need of both but against this method there is the greater amount of interference and strain which an operation of this character puts on an already enfeebled patient. While considering the general lines of operative treatment in obstruction one must refer to the experimental work of Costan^{VIII}. In his experiments on animals he has shown that the absorption of toxins is through the lymphatics to the Thoracic duct and when this was opened and drained in animals whose alimentary tract had been previously obstructed the life of the animal in a large number of cases was saved and/

and in all cases prolonged. In control experiments without drainage of the duct the animal rapidly died. The practical application of this finding to surgery has not been worked out but it indicates that the lymphatics should be taken into account and to prevent a continuation of the absorption of toxins in some obstructions it may be necessary to supplement the relief of the obstruction by a lymphaticostomy. The experiment also points to the advisability of combating dehydration by intra-venous infusions rather than by fluid given by the mouth. Having discussed the treatment of obstruction from the general stand-point we must now consider the individual treatment of the various types of obstruction.

I. External Hernia. In the treatment of strangulated hernia of either the Inguinal or Femoral type the obstructed gut must be carefully cut down upon. With the tissues in an oedematous and swollen condition there is a considerable danger if great care is not taken of injuring the bowel wall and in that way soiling the whole operation area with bowel content. A hernia director may be used to help avoiding this. The strangulated gut having been freed, it must be drawn well out of the wound and thoroughly inspected and the viability or otherwise of the section decided upon. Particular attention must be paid to the part of the gut which/

which has been actually nipped by the constriction as it is in that region that the bowel is most likely to give way, and if returned to the abdomen in a non-viable state would lead to a fatal peritonitic infection. As regards viability strangulated gut may be roughly divided into three principal Groups.

1. Safe - It may be considered safe when there is no lymph upon its surface; when it has not lost its gloss; when oedema and bogginess are absent and when it gradually regains its colour on the removal of the constriction and on being bathed with warm saline.

2. Doubtful - It must be considered doubtful when it has lost its gloss and when there is much delay in the return of colour on freeing the constriction and when the fluid in the sac is blood-stained.

3. Dangerous - It must be considered dangerous when it is black and boggy; when the constriction rings remain clearly outlined and peristalsis completely absent, and when the fluid in the sac is bloodstained and foul.

The further treatment therefore will depend upon the condition of the gut. If it is safe it will be returned to the/

the abdomen after being bathed with warm saline and the wound closed up, the operation being completed as for the cure of an unstrangulated hernia. If there is any doubt as to the viability of the gut and the patient happens to be in good condition the safest and best course is to at once resect the strangulated gut, perform a lateral anastomosis and close up the wound. If, however, the condition of the patient is bad the strangulated bowel must be either ~~quite~~ *quickly* resected and the two ends brought out and fixed in the wound. A lateral anastomosis being done later when the patient has recovered from the obstruction. Another procedure in similar circumstances would be to fix the strangulated Section itself in the wound and introduce a Pauls tube for drainage. The operation as before would be completed at a later date.

In strangulated Umbilical hernia which are usually large and often multilocular the obstructed mass should be exposed by an oval shaped incision which will go right down to the External Oblique Aponeurosis. The neck of the sac should be clearly defined in its whole circumference and this being done it should be incised with great care. This opening is gradually enlarged, all adherent Omentum being ligatured and cut until the entire sac and its contents are exposed. These are carefully examined so that no loculi are missed and all adhesions are freed and the strangulated loop
or/

or loops of gut sought for. In a case of my own of over twenty years standing there are no less than seven loculi and the amount of herniated bowel so great that considerable difficulty was experienced in returning it to the abdominal cavity. The sac having been thoroughly examined, the strangulated bowel must be inspected in regard to its viability and the further treatment will be similar to that in femoral or inguinal hernia. In these large Umbilical Hernia it is sometimes necessary to use a filigree in order to effect a satisfactory cure. This, of course, is due to the fact that in these cases the abdominal wall is inherently weak and very much stretched, as a result of which it is impossible to close efficiently the gap without the use of some such contrivance.

After treatment - In uncomplicated cases all that is necessary is to procure sleep and provide a fluid diet. Enemata should be used to empty the bowels for the first 48 hours but after that purgatives in the form of Calomel in small repeated doses (one grain every hour up to five grains) may be given. If there is any tendency to distension Pituitrin or Eserine may be given hypodermically. If the strangulation has been severe and accompanied by faeculent vomiting after lavage of the stomach Saline & Glucose should be given either Intra-venously or per Rectum. If the latter method/

method is used, continuous administration may be done, if the former then two or at the most three pints should be given. When resection ^{followed by} of a lateral anastomosis have been carried out particular pains must be taken to avoid distension and a soft Rectal tube passed high up into the bowel is very useful for this purpose and it may be further avoided by the use of turpentine enemata. Nothing but fluids should be given for the first 36-48 hours and if the case progresses Bengers' food or pounded fish may be given on the third or fourth day. Normal diet should not be resumed for 14-21 days.

After external hernia the most common cause of acute obstruction is :-

Intussusception. There is no form of acute obstruction in which the time of operation has such an important bearing on the end result of the case as in intussusception.

Sargent ^{IX} gives the following table to illustrate this point in a series of 100 cases.

<u>Day of Operation</u>	<u>No. of Operations</u>	<u>Mortality per Cent.</u>
First	35	37
Second	36	39
Third	33	61
Fourth	15	67

The method of reduction by inflation alone is now condemned/

condemned by most authorities (E ^X Moynihan). Used in conjunction with an abdominal operation it will give good results but no better than the surgeon's hands. It should, therefore, be completely discarded and early operative interferences instituted in all cases. The extent of the operative treatment will vary with the condition found. If the intussusception is reducible the bowel below the apex of the intussusception should be grasped between the finger and thumb and the tumour having been straightened out gentle pressure is brought to bear on the apex of the invagination *until it* is completely undone. The terminal portion may be difficult but steady pressure over gauze wrung out of warm saline will in the majority of cases suffice. The greatest possible gentleness must be observed throughout these manipulations and pulling on the bowel rigidly avoided.

If the intussusception is Irreducible and Gangrenous the condition may be treated by one of three methods.

I. The whole tumour may be incised and end to end or lateral anastomosis done.

II. Removal of the intussusceptum alone through an incision in the sheath - Jesset's Operation.

III. Resection and the formation of an artificial Anus

In Jesset's operation where the intussusceptum is received by the Intussusciens the two portions of bowel are/

are united by a continuous catgut suture which picks up the serous and muscular coats of each section. A longitudinal incision is then made in the sheath at a point opposite the mesenteric attachment. The incision is long enough to allow the intussusceptum to be pulled out. This being done its base is cut across and a few catgut sutures are passed through all the coats of the stump and tied tightly in order to control haemorrhage. The stump is now allowed to drop back into the lumen of the bowel and the incision in the latter repaired by the usual two layers of sutures.

After reduction of the invagination the bowel should be quickly examined to find if possible any organic cause for the invagination taking place and if found to remove same. This might entail the removal of an intestinal polypus or an inverted Mickels diverticular. That intensive operative interference increases the mortality rate to a very marked extent is shown by the figures given by the E.R.F. list^{XI}.

Reduction in 114 cases	27 deaths	Mortality 27%
Resection in 29 cases	26 deaths	Mortality 89%

Early operation must, therefore, if possible be insisted upon more in this condition than in any other.

III. Volvulus. The treatment of obstruction due to volvulus is in the main essentials similar no matter whether the/

the section of bowel involved ^u in the Pelvic Region, Ileo
Caecal Region or in Jejunum or Ileum. In the treatment
of volvulus of the pelvic Colon a mid-line incision below
the umbilicus must be made and the hand introduced into the
abdominal cavity. The distended portion of gut must be
brought out of the wound if at all possible. The next step
is the emptying of the affected loop. In some cases with
one hand in the abdomen it is possible to guide a rectal
flatus tube past the twist in the bowel and in this way
rapidly evacuate the bowel which can then be untwisted. If
this method fails it will be necessary to open the distended
loop and pass a tube into the lumen of the bowel. In doing
this the greatest possible care will be taken to prevent the
infection of the surrounding tissues by carefully packing ^{off}
the part of the bowel to be opened with large swabs wrung out
of warm saline. The distension having been got rid of the
twist must be undone. In some cases this is quite easy but
in others, where there are adhesions present or where the
mesentery is shortened by the infiltration of a malignant
growth, great difficulty may be met with. The twist having
been undone, the viability of the bowel must be considered.
If it is viable the opening, if one has been made, is closed
and the gut returned to the abdomen. To prevent recurrence,
which is not rare, the Pelvic Colon may be stitched to the
parietal/

parietal peritoneum or else the mesentery should be shortened by folding it upon itself in a direction parallel with the bowel and suturing the apex of the bowel to the root of the mesentery. In a case of my own the patient had had a volvulus six years previously which had been untwisted without any fixing of the colon being done. Since that operation he had considerable difficulty in getting his bowels to work with anything approaching regularity and this state of affairs continued until an acute obstruction developed. In operation I found a twisted, distended and very much hyperthrophied pelvic colon. On undoing the twist after evacuation through a rectal tube I fixed the colon to the Parietal peritoneum of the Anterior Abdominal wall. Since operation (over two years ago) the patient has had no recurrence and his bowel movement is perfectly regular.

If the distended loop of bowel is gangrenous the most hopeful measure to be employed is to resect the gut and bring out the two cut ends to the wound for drainage, a Paul's tube being tied into each end. At a later date, if the patient survives and is in fit condition to stand a more prolonged operation, a lateral or end to end anastomosis is performed. If the volvulus cannot be untwisted then an artificial Anus must be made above the level of the twist and the distended coat in addition drained by means of a Paul's tube. If the patient/

patient survives then a resection of the whole mass involved and a lateral or end to end anastomosis must be done at a later date.

In volvulus at other sites the treatment is on the same lines. It will be noticed that when the Ilio caecal region is involved the difficulty in undoing the twist owing to adhesions is often very great.

IV. Gallstone Ileus.

Although obstruction by gallstones is the simplest form of obstruction met with yet the mortality rate is high. This is due to three factors.

- I. Delay in operation.
- II. Obesity of patient.
- III. Age of patient.

Recent writings on this subject seem to indicate that in this condition more than in any other cause of obstruction the mortality rate should come down (the percentage figures for all the London hospitals is still 50). ^{XII} Bennett reports a series of five cases without a death. Personally I have only seen two cases and both recovered. In each case the operation was performed within 48 hours of the onset of the symptoms. A para-median incision below the Umbilicus will usually meet the case. The distended bowel is rapidly passed through the fingers until the obstruction/

obstruction is found - this is usually in the lower Ileum. The loop of gut with the impacted stone is then brought out of the wound and packed off with gauzes. The bowel is opened by an incision in its long axis and the stone removed. The bowel is then sutured by usual two layers of sutures and returned to the abdomen.

V. Obstruction by adhesions.

This cause of obstruction is most usually previous inflammatory infection of the abdomen or disease of the glands or Peritoneum. Congenital bands form a very small proportion of these cases. The abdomen should be opened in the mid line and the obstruction sought for. If the adhesions can be undone the operation is simple and soon over, but in many cases, more particularly in those due to a tubercular infection, the section of the bowel affected is a mass of adhesions which it would be impossible to separate without the grave risk of injuring the bowel in several places, and all that can be done is a lateral anastomosis between a section of bowel above and one below the mass affected.

VI. Internal Hernia.

Obstruction by bands and by strangulation through abnormal apertures is usually characterised by the most acute/

acute symptoms. It is seldom, if ever, possible to give an accurate diagnosis before laparotomy and the only hope of the patient is, as before, early operation. The abdomen is opened in the mid-line below the umbilicus, and the obstruction sought for. In the case of bands, these should be divided between clamps; place as close as possible to the stump and the latter peritonised to prevent adhesions forming. In the case of a Meckels diverticulum acting as a band, it should be carefully freed from any adhesions it may have, and then divided close to its base between clamps. The cut base is then closed by a through-and-through suture and then ~~bound~~^{bound} by a circular sero-muscular stitch carried round after the manner of ~~binding~~^{burying} an appendix stump. An appendix acting as a band is similarly dealt with. In obstruction by strangulation through apertures the constricting margins of the ring must be divided or stretched in order to release the bowel. Great care must be taken to avoid injury to the blood supply of the bowel. If the obstructed loop of bowel is gangrenous, it must be brought out of wound and drained unless the condition of the patient warrants an immediate resection being undertaken. The aperture must be closed to prevent recurrence.

In the case of a hernia into the Foramen of Winslow,
as/

As the structures forming the boundaries of the ring do not admit of division, the distended coil of bowel must be emptied by an opening into the lesser sac through the gastro-hepatic omentum and the bowel drained. It should then be stitched in the usual manner, returned to the lesser sac, and then withdrawn through the Foramen, the edges of which must be approximated as in cases such as these it is abnormally large and lateral.

In the case of Duodenal hernia the constricting ring may be stretched but not divided, as it contains either the Superior Mesenteric Artery or the Inferior Mesenteric Vein.

^{to} Retro-Caecal herniae are usually easily reduced, and call for no special comment in regard to treatment. In all these cases of Internal Hernia the most important point in operative technique is the efficient packing off of the rest of the General Peritoneal Cavity, thus preventing it being soiled by highly toxic material.

In a diaphragmatic hernia it is necessary, when strangulation has occurred, to open up the pleural cavity by the resection of several ribs. In this way the risk of pulling a gangrenous or perforated loop of bowel into the General Peritoneal Cavity is avoided and the repair of the tear in the diaphragm - always a difficult procedure - is made/

made more easy.

VII. Enteroliths, if causing obstruction, are treated in an exactly similar manner to gall stones and no points call for special consideration.

VIII. In obstruction by Faecal Impaction an artificial anus must be established. The bowel above the obstructing mass having been emptied and the patient recovered from the shock the faecal accumulation must be softened and removed by injections through the anus and the artificial opening. At a still later date the cause of the chronic constipation, necessary for this condition to arise, must be sought for, and if possible removed or at any rate ameliorated. A general or partial visceroptosis may be present. A colotomy may prove necessary or the after treatment may be limited to the wearing of a supporting abdominal belt coupled with massage and exercises to improve the tone of the abdominal muscles. In addition most careful attention must be paid to the regulation of the bowels.

IX. Post-Operative Obstruction.

By this type of obstruction one means that due to a paralysis of the intestine - namely adynamic Ileus. If seen early the introduction of a flatus tube may give relief. If this does not act quickly a large turpentine enema (one pint and a half of warm soapy water with two tablespoonfuls of turpentine) should be given and repeated if necessary. In addition/

addition a C.C. of Pituitrin should be given hyperdermically. If the distension still persists, then a second laparotomy is immediately necessary. The abdominal cavity should be quickly examined to exclude any organic cause for the obstruction, and on failure to find which a Jejunostomy, as high up as possible, should be done. Through this opening the small bowel contents should be siphoned off continuously and saline and glucose poured into the bowel. In addition saline should be given either intravenously or subcutaneously to dilute the toxins already circulating in the system.

X. In Embolism or Thrombosis of the mesenteric vessels the obstruction caused shows a very high mortality rate (90%). In a large proportion of cases the patient is in such a bad condition that successful operative treatment is hardly possible. Where the length of the gangrenous gut is limited this should be resected, the affected loop having first been brought out of the abdominal cavity and well packed off. The cut ends may be drained by a Paul's tube put into each section or the two ends may be brought out side by side and a faecal fistula formed. If the patient recovers, a second operation will be necessary to reconstitute the continuity of the alimentary tract.

XI. Acute Obstruction due to Stenosis of the bowel.

Stenosis of the bowel may be brought about by:-

1. Malignant/

1. Malignant Growth.
2. Hypertrophic Tuberculosis.
3. Actinomycosis.
4. Fibromatosis.
5. Dysenteric Ulceration (Cicatrical Stenosis).

When any of these pathological conditions have progressed to such an extent as to produce an acute obstruction, the treatment in the first place is limited to draining the bowel above the obstruction by the formation of an artificial anus or performing a lateral anastomosis between the bowel immediately above and below the site of obstruction. Supposing that an artificial anus has been made and that during this operation it has been evident from palpation within the abdomen that the growth is limited to the bowel wall and that glandular involvement is either small or absent, then in about 14 days a second operation must be performed in which the segment of bowel involved must be resected and a lateral anastomosis formed to reconstitute the continuity of the alimentary tract. In the case of the large bowel in which growth remains for a considerable time limited to the bowel wall and is slow to invade mesenteric glands it may be possible to attempt the complete removal of the disease. This will necessitate wide resection of the affected segment, removal of lymphatic glands and vessels into which the bowel drains and an end-to-end or lateral anastomosis. If obviously irremovable, the best line of treatment would be to do a short/

short circuiting operation such as an Ilio-Sigmoidostomy.
When the cause of the obstruction is non-malignant,
resection and anastomosis is the operation of choice.

CASES.

In the hospital to which I am attached, the following are the statistics of cases of Acute Obstruction admitted during the past two years.

	No. of Cases Operated Upon.	No. Died.
Strangulated Hernia	28	6
Intussusception	7	2
Gall stone Obstruction	3	0
Volvulus	3	1
Enterolith	1	0
Superior Mesenteric Thrombosis	1	1
Adhesions	31	18
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	74	26

It will be seen from the above that the mortality rate for all cases works out at a little over 30%. This compares quite favourably with that of the larger hospitals, but allowance must be made for the much larger number of cases treated at these institutions.

The following are some notes on a few representative cases selected from among those for which I personally was responsible.

Case 1. Strangulated Umbilical Hernia.

Female/

Female patient aged 56. Had seven children. first began to be troubled with hernia 10 years ago. Mass gradually increased in size, and on two occasions patient complained of pain and abdominal distension which, however, subsided under treatment by rest and turpentine enemas. On this occasion the mass became much larger and tender. Patient complained of considerable abdominal pain, and vomiting. She had not sent for her own doctor for three days, and on admission to hospital faeculent vomiting was present, and the umbilical mass was inflamed, tense and tender. The stomach was washed out, and the hernia exposed. The loop involved was black and lustreless, and an immediate resection was performed, and operation completed with a lateral anastomosis. Patient made a good recovery after going through a bad period of distension for the first week.

Case 11. Volvulus of Pelvic Colon.

Patient, a male aged 64. History of Chronic Constipation of twenty years duration, and an operation for twisted bowel seven years ago. Patient now gave history of increasing difficulty in obtaining motion for past six months, with absolute and complete obstruction for two days. He had himself taken large quantities of purgatives, in an attempt to get his bowels opened, but without avail. Three enemas administered by a district nurse were returned with no faecal result. On admission, patient's abdomen showed marked distension/

distension, he complained of pain all over his abdomen, and had loud borborygmi. The abdomen was opened in the midline, below the umbilicus, and a considerably distended, and much hypertrophied Pelvic Colon immediately came into view. A successful attempt to get a high flatus tube past the obstruction caused an immediate and great reduction in the distension, and this allowed of the twist being very easily undone. The loop was fixed at two points to the anterior parietal peritoneum, and the abdomen closed. The patient made an uneventful recovery.

Case III. Adhesion and Kinking of bowel. Previous operation.

Patient was a female aged 42. History of Caesarean Section two years previously. For last six months, recurring attacks of colic and slight distension had been complained of. These attacks had subsided completely with rest and a purgative (Ol Ricini). The present attack lasted 36 hours, and the usual treatment had no effect. When seen, the abdomen was slightly distended, and a considerable amount of griping pain was complained of; Temperature 98.4, pulse 84. She had vomited twice during the last twenty-four hours, and turpentine enemas had given no relief. Abdomen was opened below umbilicus, and small bowel was seen to be moderately distended. On search being made, a loop of same was found adhered to the top of the uterus and markedly kinked. The adhesions were carefully undone/

undone, and raw surfaces peritonised. Patient made a good recovery.

Case IV. Rupture of Septic Gall bladder. General Peritonitis.

Patient was a male aged 51 years. Frail man who gave a history of chronic indigestion of many years' duration. He was seized suddenly with acute abdominal pain followed by a rigor and vomiting. He did not call in his own doctor for 24 hours because the initial pain had abated somewhat. On admission the abdomen was greatly distended and vomiting continuous and faeculent. The stomach was washed out and abdomen opened in the midline above the umbilicus. There was an immediate escape of bile-stained fluid, and on further examination the small gut was seen to be intensely congested and dilated. The gall bladder was chronically inflamed and perforated. High Jejunostomy was done but patient died an hour after leaving the table.

Case V. Strangulated Femoral Hernia.

The patient was a male aged 32. History given of two previous occasions on which swelling appeared at the same site, but on rest and manipulation it had disappeared. On this occasion the lump was considerably larger and more tense with an inability to return same to abdomen after rest in bed for several hours and the application of fomentations. On admission to hospital patient complained of a good deal of general/

general abdominal pain, and had vomited once. The hernia was now tense and tender and absolutely irreducible.. The patient was immediately operated upon. The herniated bowel was found to be viable and was returned to the abdomen. Patient left hospital in three weeks after an uneventful recovery.

Case VI. Malignant Stricture of Pelvic Colon.

The patient was a male aged 40 years. In perfect health up to three months previously when obstructive symptoms developed. At that time he was seized with very severe colic which he attributed to eating tinned beans. This cleared up under treatment, but he had recurrences in five weeks' and two months' time. From the latter attack he never got complete relief, and finally became absolutely obstructed and in this state was admitted to hospital. The abdomen was much distended, and tender on the left side. Temperature 99.2. Pulse 100. His tongue was furred and dry, and there was a pinched look about his face. A left inguinal colostomy was done under a local anaesthetic, and patient did extremely well. A month later the abdomen was opened in the midline, and on examination a well developed constriction on the upper limb of the sigmoid colon was found. There was also definite glandular involvement, but no secondary growths in Liver. A wide resection and an end-to-end anastomosis done. The original colostomy wound was kept open for a week longer. The patient/

patient did extremely well for a period and returned to work, but ultimately succumbed sixteen months after last operation with symptoms of liver involvement.

Case VII. Intussusception.

The patient was a male child aged 11 months. History of severe abdominal pain of three days' duration, coming on in spasms two or three times daily, and accompanied on the third day with passage of blood per rectum. On admission child's abdomen was greatly extended. Temperature subnormal, and Pulse 160. No tumour was felt on account of distension. The abdomen was opened in the midline. Very much distended coils of small gut, immediately evident. Intussusception of enteric variety with apex approaching Caecum found. There was no difficulty whatsoever in reducing this intussusception, and the abdomen was closed. The child died twelve hours after operation.

Case VIII. Obstruction due to Gallstone.

Patient was a female aged 56. Previous history of biliary colic and jaundice extending over number of years. On the present occasion patient was suddenly seized by severe colic. The pain was worst in the region of the umbilicus, and was quickly followed by vomiting. Complete constipation was present. The abdomen was greatly distended, but no contracting coils were visible owing to the obesity of patient.

The/

The abdomen was opened, and small gut rapidly examined, and found obstructed by stone in the lower ileum. The obstructed coil was brought out of the wound and incised over the stone which was removed. The bowel was closed in the usual manner. The stone measured $1\frac{3}{4}$ inches in diameter. The patient made an absolutely uneventful recovery.

Case IX. Strangulated Inguinal Hernia.

Patient was a man aged 37, who gave history of presence of hernia for over five years, with no disability from the condition. Patient was now attacked with abdominal pain and sudden increase in size and tenseness of his hernia. Vomiting recurred soon after onset of pain, and was repeated at frequent intervals. All Purgatives taken were returned. Complete constipation and marked distension were present. The hernia was exposed in the usual manner, and the strangulation relieved and loop of bowel involved withdrawn from canal. Condition of gut was doubtful, and a portion was immediately resected, a lateral anastomosis being done. Patient recovered.

Case X. Obstruction due to adhesions following Appendectomy.

Patient was a male aged 25, who gave a history of operation for appendicitis two years previously to present illness. When the appendix was removed and abscess drained he made a good recovery, and kept well until four months ago, when/

when he began to have difficulty in getting a regular motion, and had several attacks of abdominal pain, felt chiefly in appendix region. All these passed off with rest in bed, purgatives and enemas, until the present attack, which on admission had lasted for three days. The abdomen was very much distended and vomiting was severe and becoming faeculent. The abdomen was opened in the midline below the umbilicus, and caecal region immediately examined. Numerous adhesive bands were present, and the bowel was badly kinked at one spot. The bands were removed, and the adhesions undone. On account of the severe toxæmia an enterostomy was done high up in the Jejunum, and a tube brought out through the omentum. The small gut was in that way well drained, and saline and glucose administered hourly through the tube. After a bad 48 hours patient made a good recovery.

Conclusion.

In conclusion there is no doubt whatsoever that for the successful treatment of acute intestinal obstruction early diagnosis of the condition is essential. It is endangering the patient's life to wait for faeculent vomiting and distension before making a diagnosis. A great many lives would be saved if every case which could be definitely classed as "acute abdomen" was operated upon forthwith without waiting for/

for a definite diagnosis of the cause at work. Excluding cases of the nature of strangulated external hernia or intussusception the presence of complete constipation (the cessation of the passage of faeces or flatus for a period of twenty-four hours during which time two turpentine enemas are given) is the most important sign and on its presence being established the diagnosis of obstruction should be considered absolute even if other symptoms are absent. Operative treatment should be commenced forthwith. Lavage of the stomach both before and after operation is essential. In severe cases it diminishes the risk of regurgitated faeculent vomitus being inhaled into the patient's lungs. In severe cases in which the patient is deeply toxic and in no fit condition to stand a prolonged operation, the performance of a high Jejunostomy will in a considerable number of cases tide the patient over the crisis and allow for the operative treatment to be carried out at a later date. It must in all cases be helped by the administration of saline subcutaneously (a) to make up for the great loss of body fluids caused by the continuous vomiting and (b) to dilute toxins already absorbed.

The alternative to Jejunostomy, i.e. lateral Anastomosis and caecostomy - puts a much greater strain on the patient at the/

the time of operation, although it makes better provision for absorption and nutrition. On the whole I prefer, in deeply toxic cases, Jejunostomy as giving the better chance to the patient.

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| II. | Carson's | Modern Operative Surgery. |
| III. | Roberts | Recent Advances in Surgery. |
| IV. | Zachary Cope | The Early Diagnosis of the Acute
Abdomen. |
| V. | McAdam Eccles | Hernia. |
| VI. | Lejars | Urgent Surgery. |
| VII. | Gant | Constipation and Intestinal
Obstruction. |
| VIII. | Treves & Hutchison | Operative Surgery. |
| IX. | Moynihan | Abdominal Operations. |
| X. | Adams | Acute Abdominal Diseases. |
| XI. | Howard | Surgical Emergencies. |
| XII. | Jacobsen | System of Surgery. |