minimum interference with the knee-joint, and rapid return of function is favoured. (Arthrotomy in miniature.)

5. A complete arthrotomy should be reserved for knee-joints in which loose bodies occur in considerable profusion in the three anterior pouches.

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An Address

ON

THE TREATMENT OF OBSTRUCTIVE LESIONS
OF THE COLON.*

BY

J. P. LOCKHART-MUMMERY, F.R.C.S.,

SENIOR SURGEON, ST. MARK'S HOSPITAL, LONDON.

TWENTY years ago chronic obstructive lesions of the colon were rarely, if ever, diagnosed, except as the result of an operation for acute obstruction or a *post-mortem* examination. At the present day the majority—I would almost like to say the great majority—of such lesions are diagnosed and treated before the onset of acute symptoms. Statistics on such a subject are difficult to obtain, but a paper recently published by Burgess of Manchester contains figures which illustrate this point.¹ Out of 485 cases of cancer of the colon admitted between the years 1913 and 1922 to the Manchester Infirmary 173 had acute obstruction—that is, 64.4 per cent. were diagnosed before acute obstruction had occurred. I know from my own experience that each year I see more cases where the diagnosis is made or suspected in time to prevent the onset of acute symptoms.

The results of operations for obstructive lesions of the colon twenty years ago were very bad. The mortality was high and the recoveries were for the most part accompanied by a permanent faecal fistula of some kind. As the result mainly of improved diagnosis all this has been changed, and there are now few serious conditions which show better results from skilled surgery.

The fact that the surgeon is now able to operate upon lesions of the colon before the onset of obstruction has entirely altered the type of operation performed for this condition, and with proper precautions and careful technique it is now possible to resect that portion of the colon containing the lesion and to join the bowel up by axial union in one operation with very little risk—a procedure which was almost unheard of twenty years ago, when Paul's two-stage method, Senn's plates, Robson's bobbin, or Murphy's button were in use.

I do not propose to describe in detail the symptoms of obstructive lesions of the colon, but only to say that in my experience the most important early symptom is repeated irregularity of the bowel actions without adequate cause, more particularly repeated attacks of slight diarrhoea alternating with constipation and vague abdominal discomfort. We have a number of methods to help us in making a diagnosis, but it is as well to own that none of them are very reliable. The presence of occult blood in the stools on microscopical examination is valuable in cases of cancer, but cannot be relied upon, and is of no negative value.

X-ray examinations after a barium enema are very useful, but must be very well done with a first-rate apparatus having a very short exposure so as to eliminate movement of the bowel and ensure a sharp edge to the shadows. Also the examination must be repeated to avoid as far as possible accidental appearances. The

appearances of a well marked filling defect in one part of the colon if the examination is repeated some days later affords valuable evidence, more particularly if belladonna has been administered to eliminate spasm. It is not, however, entirely reliable, and the absence of a filling defect will not exclude a lesion. Lesions due to diverticulitis can now be diagnosed with considerable accuracy by the x rays and a barium enema, but very good photographs are necessary.

A sigmoidoscopic examination is very useful, and such evidence as it affords is reliable. It does not, of course, enable a growth above the middle of the pelvic colon to be seen, but it at least has this advantage—that the absence of a lesion up to this level tells the surgeon that any lesion present will be sufficiently high up to allow of resection from the abdomen, or short-circuiting by lateral anastomosis, and that colostomy can be avoided.

Too often it happens that with all our efforts we cannot arrive at an exact diagnosis, although there remains a grave suspicion that a lesion in the colon is present. In such circumstances we should not hesitate to back our opinion and advise an exploratory laparotomy. The "wait and see" policy generally results in disaster. The risks of exploratory laparotomy are very slight, while the danger of leaving a carcinoma of the colon is very grave, more especially as the results of partial colectomy for cancer of the colon are better at an early stage than those for removal of cancer in any other part of the body. Restoration of function is usually perfect and the tendency to recurrence after removal of a cancer in the colon is very slight compared with cancer elsewhere.

The majority of obstructive lesions in the colon are the result of cancer, but there are a number of other conditions which also cause such symptoms. One, which of recent years has come into considerable prominence, not because it is rare, but because it had not hitherto been recognized, is diverticulitis. This curious condition causes a tumour very similar to a malignant growth and partial obstruction of the bowel lumen, often quite suddenly, as the result of acute inflammation in, or around, the diverticula. The distinction between diverticulitis and cancer is not always easy, but the facts that the former is accompanied by signs of inflammation, while the latter is not, and that bleeding is rare in cases of diverticulitis, while it is the rule in cases of cancer, help considerably in forming a diagnosis. An x-ray examination after a barium enema will generally give well marked evidence of diverticulitis; but, of course, the presence of diverticula in the bowel does not necessarily exclude the presence of a growth also, as the two conditions are often associated.

Of recent years it has proved possible to resect completely a portion of the large bowel badly damaged by diverticulitis and restore the bowel by axial union.

Hyperplastic tubercle is a rare disease which gives rise to stricture and tumour in the colon and closely simulates diverticulitis. It can be completely cured by resection of the affected portion of the bowel. Bands and adhesions are, of course, frequently met with, involving the colon and causing obstructive symptoms. They are difficult to diagnose, but very easy to treat once they are detected.

Chronic volvulus is a rare condition, which is occasionally diagnosed as the result of an x-ray examination. Quite recently I was able to make this diagnosis in a middle-aged lady who had repeated attacks of obstruction, which came on quite suddenly with great pain and distension. The attacks had gone on for a number of years, but were getting more severe and less easily amenable to treatment. At operation a very large volvulus of the sigmoid was found, which was exactly as seen in the x-ray photographs; I resected the whole loop and performed an end-to-end junction with complete success.

The patients suffering from obstructive lesions of the colon are usually elderly, and this adds an element of risk. Fortunately with proper care we are now able to operate on quite elderly people with little more risk than would be the case with younger patients, providing certain precautions are taken, but these precautions must be very carefully observed.

I attach great importance to very careful preparation of the patient. At least a week should be devoted to this.

* A paper read before the Nottingham Medico-Chirurgical Society, March, 1927.

The bowels should be well cleared (with castor oil for preference), and then kept moving easily with petroleum and drachm doses of castor oil. On no account should the patient be operated upon till several days have elapsed after the necessary preparation, and those days should be spent in bed so as to rest the heart and allow the patient to build up a reserve of energy. This preparatory treatment often causes the patient annoyance, as he fails to see the necessity for it; but I am convinced of its advantages. Small doses of strychnine during the week prior to operation are also helpful. Some form of intestinal antiseptic should also be given; of these I favour kerol and Bulgarian lactic acid bacilli to modify the intestinal flora. The hygiene of the mouth should be attended to, and the patient given plenty of water to ensure that the tissues are well washed out and the blood volume good; a dehydrated patient is always a dangerous one to operate upon. In cases of exceptional risk a blood transfusion should be performed some days before operation.

The anaesthetic is of considerable importance, and ether and chloroform as a rule should be avoided as far as possible. I favour a combination of twilight sleep and local or spinal anaesthesia, or gas and oxygen and local anaesthesia. This greatly reduces the risks, as it enables us to avoid making the patient sick or ill, and does not interfere with his nutrition by causing dyspepsia and loss of appetite.

The incision, of course, depends on the situation of the lesion, but when this is known approximately I always prefer a diagonal incision, which gives free access to the colon. It is also the most convenient for local anaesthesia, as it does not involve more than one nerve in the main incision, and this can be readily blocked. It is easily closed, and does not, in my experience, result in hernia. I have used this incision for many years, and consider it vastly superior to any other. It affords the best and easiest access to the parts, and enables the surgeon to work with the minimum of disturbance of the abdominal cavity.

If the lesion, as is usually the case, is on the left side, the patient should be rolled over slightly to the opposite side, with sandbags under the hip and shoulder and a large pillow under the knees. In this position the colon comes easily into the wound and the small bowel falls away and does not interfere with the operator. Should it be necessary to resect the splenic angle, easy access to this part of the colon will be secured by prolonging the incision backwards towards the last rib.

When the bowel can be drawn out of the wound I prefer to make an open resection with the ends of the bowel and mucous membrane exposed, merely controlling the contents with rubber clamps. The ends are sewn together under the surgeon's eye, and it is possible to be sure that a proper blood supply is left at both ends. One of the chief reasons why axial union of the large gut has been considered unsafe is because surgeons have not realized the importance of ensuring a good blood supply to both ends of the bowel. The blood vessels of the large gut are parallel with each other and anastomose comparatively little; as a result, if the bowel is cut directly across, the stitches joining the ends on the mesenteric side are liable to constrict the blood vessels feeding the junction on the side opposite the mesentery, and most of the disasters that have occurred after axial union of the colon, and were often attributed to faulty stitching, have really been due to sloughing from an inadequate blood supply. As I pointed out many years ago, this difficulty can easily be got over by dividing the bowel at an angle of 45 degrees instead of at right angles. This has the advantage of ensuring a good blood supply to the whole of the joined edges, and also compensating for any narrowing of the lumen caused by the stitching. I put in a couple of guide stitches at either side of the bowel ends, and then sew straight across from one side to the other on the mesenteric side, the stitch being continued right round until it reaches the point where it commenced. A second, peritoneal stitch is then inserted, which also closes the gap in the mesentery on the inner side, a slight gap being left on the outer side of the mesentery to drain the mesentery itself and prevent the formation of a haematoma

here which might interfere with the blood supply of the bowel ends. A cuff of omentum is then sewn over the junction with two or three stitches, a fold of omentum being pulled down for the purpose, or a piece of the omentum cut off as a free graft. The advantages of this procedure are that it protects the line of junction and prevents small gut getting stuck to it during the process of healing. Before I made a practice of this I had one or two cases where the abdomen had to be reopened for intestinal obstruction, and I found a small angle of gut adhering to the junction in the colon. A small rubber cigarette drain is left down to the site of junction and the wound closed in layers. Finally—and to this procedure I attach great importance, as I consider it one of the chief means of reducing the risks of partial colectomy—I insert a tube into the caecum so as to form a temporary tube caecostomy. The tube is left projecting from the wound on the right side and connected by a soft rubber tube to a bottle or bucket beneath the bed. The advantage of the temporary caecostomy is that it allows the bowels to act and prevents any strain being thrown upon the new junction; it also prevents distension of the colon and allows the bowel to be washed out if necessary. On the ninth day the tube becomes loose and the temporary caecostomy either closes immediately or in the course of the next day or two without any further attention. It has none of the objections of an ordinary caecostomy—there is no mess, and it closes automatically. I always drain the caecum in any operation involving the removal of part of the colon, the only exception being in removal of the caecal angle, where, owing to the liquid contents of the bowel, it is not always necessary.

CLOSED METHODS OF AXIAL UNION.

Several different operations have been described for joining the colon axially without exposing the mucous membrane. There are those of Martel, of Kocher, and of Murphy. The principle is the same in all. The bowel is divided between clamps, and then the two ends are sewn together over the clamps with a stitch, which takes up the serous and muscular coats, the clamps being withdrawn before tying the last stitch. At no stage in the operation is the lumen of the bowel exposed, and it is, therefore, easy to keep the site of operation clean. The advantages of this method are more apparent than real. It seems fairly certain that the juice squeezed out by the clamps on crushing the bowel must contain micro-organisms. Another serious disadvantage is that one is relying entirely upon the crushed edges of bowel to prevent haemorrhage. The blood vessels lie in the submucous layer and are not controlled by the stitches, and we know that crushing is not a very satisfactory form of haemostasis. I personally prefer to make sure that my stitch has controlled all bleeding points.

COLECTOMY IN SPECIAL SITUATIONS.

The Caecal Angle.—This part of the large bowel is particularly suitable for colectomy. The blood supply is good, and the whole caecal angle can be easily stripped up towards the mid-line so as to get mobilization. It is better to make a fairly extensive rather than a limited resection in this position. I prefer to remove the entire angle, close the hepatic end of the transverse colon, and implant the small gut into the side of the colon. This tends to reproduce the original condition and to form an artificial ileo-caecal valve. Where it is possible the ileo-caecal valve itself should be preserved, but this is very seldom possible, as a common situation for growths is quite close to the valve. Owing to the liquid character of the contents of the bowel in this situation temporary drainage of the bowel is not necessary. The results are usually very good, and it is the easiest part of the colon to resect.

The Transverse Colon.—The chief difficulty here is in separating the growth from the stomach; it may even occasionally involve a partial resection of the stomach. The omentum is separated on either side and then stitched over the junction at the termination of the operation; but it is advisable to leave a gap in the omentum for drainage, or secondary abscess may occur behind the bowel in the lesser sac. Colectomy in this situation is generally fairly easy.

The Splenic Angle.—The diagonal incision already described is very useful here, as it gives excellent exposure of the angle and allows the colon to be easily freed. It is very necessary to free the colon thoroughly to get the ends to come comfortably together. Care has to be taken in freeing the angle itself not to damage the lower part of the spleen, which is in very close contact, or the kidney and pancreas, which are close behind it. Some of the best results I have seen have been in cases of resection of the splenic angle. I removed a carcinoma of the splenic angle in a jockey eleven years ago, and this year he won one of the classical races.

The Pelvic Colon.—This is the commonest situation, and more than half the cases of resection are included in this area of the colon. Much depends upon the part of the pelvic colon involved. If it is in the descending colon, or upper part of the pelvic colon, the resection should not be difficult. Greater difficulty, however, occurs when the lower part of the pelvic colon is involved. In all cases the outer layer of the pelvic mesentery should be divided near its base for a considerable distance and the bowel carefully stripped up so as to free it well from the left iliac fossa. There are no vessels entering the mesentery at the outer aspect, so that free stripping is quite safe, and considerable mobilization of the colon can thus be obtained. The chief difficulty arises with cases of diverticulitis, as there are frequently dense adhesions to other structures, more particularly the bladder in males, and the uterus or left tube in females. It is very important to interfere as little as possible with adhesions in cases of diverticulitis, as serious sepsis may be lighted up. On the other hand, the condition is not malignant, and excision should be carried out when possible, even though parts of other organs have to be sacrificed. I have on several occasions removed the whole uterus and left tube and resected portions of the small gut in order to remove tumours due to diverticulitis. If the bladder is extensively involved excision is, of course, out of the question.

The Lower End of the Pelvic Colon.—For two reasons this is the most difficult situation. The first is that there is often not enough healthy bowel below the tumour to allow of a proper resection, or the bowel is so short that the resection has to take place within the abdominal cavity. The second, and more serious, difficulty is that the blood supply to the upper part of the rectum is liable to be gravely interfered with if a portion of the pelvic colon immediately above has to be removed. The surgeon may be faced with serious difficulty in deciding what he should do. One alternative is to make a complete abdomino-perineal excision, leaving a permanent colostomy of the upper end, and this may be the only procedure possible when the growth is low down in the pelvis, but still excisable. Another alternative is the tube method, which was described by me in 1908; the principle of this is that after removing the tumour a long rubber tube of large calibre is sewn into the upper end of the bowel, and then passed down through the rectum and out of the anus. The tube is then drawn on until the upper bowel is lightly invaginated into the upper end of the rectum and is secured there by a few stitches. This method gives very good results, but it is decidedly dangerous owing to the fact that the blood supply to the rectum cannot be relied upon. If this method has to be used the surgeon must be certain that he is not seriously damaging the blood supply to the rectum, which will depend entirely on the two lower sigmoid arteries. In view of this doubt good drainage should be provided from behind, and a temporary caecostomy or colostomy performed.

The results of colectomy are good both from the point of view of immediate risk and from that of restoration of function. The mortality from operation is about 16 per cent., but this is counting many of the older cases and can certainly be reduced much below this figure. The following table shows the mortality following colectomy (53 cases) and the condition for which the operation was performed.

	Cases.			Deaths.		
Cancer	...	41	...	...	7	...
Diverticulitis	...	9	...	...	2	...
Chronic volvulus	...	3	...	...	0	...

There must always be some risk as the patients are not only old, but often in a bad state of health from partial obstruction and dyspepsia over long periods, which cannot be entirely compensated for by the preparatory treatment. Also colectomy carries with it a fairly high risk of post-operative infarct. The risks are not serious when we consider the grave nature of the lesions for which the operation is done.

It is now quite exceptional to have any faecal fistula after partial colectomy. As a rule the wound heals by first intention and the patient is up in under three weeks quite healed. The restoration of function is perfect, as the loss of a few inches of colon causes no inconvenience. When performed for cancer this operation gives the best results of all cancer operations, as there is no mutilation or limitation of normal function, and the tendency to subsequent recurrence is very low.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, 1927, i, 1.

Notes

ON

JUVENILE RHEUMATISM:

BEING A COMPARISON OF THE REPORTS OF THE BRITISH MEDICAL ASSOCIATION AND THE MEDICAL RESEARCH COUNCIL.

BY

REGINALD MILLER, M.D., F.R.C.P.,

PHYSICIAN, PADDINGTON GREEN CHILDREN'S HOSPITAL; SENIOR PHYSICIAN TO OUT-PATIENTS, ST. MARY'S HOSPITAL, LONDON.

IN July, 1926, there appeared the first report of the British Medical Association Committee of Inquiry into Rheumatic Heart Disease in Children.¹ It dealt with four important aspects of the problem of juvenile rheumatism, of which I am now chiefly concerned with two—namely, the "Environmental and other Predisposing Causes of Rheumatic Infection," and the "Effect of Tonsillectomy on Rheumatic Infection in Children."

In March, 1927, the Medical Research Council published a report² on "Social Conditions and Acute Rheumatism," one of a series of "Child Life Investigations." As the title implies, this dealt with some of the same questions as those parts of the B.M.A. Report already mentioned.

It is the purpose of this communication to examine these two reports where they overlap and to compare their results. This has not yet been attempted: the reports made no mention of each other, and indeed were drawn up by entirely different committees and based on investigations undertaken altogether separately from each other. Both sets of investigations were prolonged and widespread, consequently where agreement is found in the two reports there is a considerable weight of evidence in favour of the result reached.

In April, 1927, the B.M.A. Committee issued a second report,³ with which I am not here directly concerned.

The chief points of contact between the two reports here to be considered are six in number. On four of them it may fairly be claimed that agreement is shown; these relate to the influence of (1) social status, (2) heredity, (3) school environment, and (4) tonsillar disease and tonsillectomy. In the remaining two questions, those of the influence of (5) contagion and (6) damp dwellings, agreement appears to be lacking.

1. The Influence of Social Status.

In this matter the B.M.A. Report made two points—namely, that rheumatic infection is far more common in the poorer classes than in the well-to-do; but that, on the other hand, the incidence of the disease was less in the lower than in the upper strata of the poorer classes. With both these views the M.R.C. Report agrees. On the first point Dr. G. F. Still gives valuable figures (p. 7):

"In the Children's Out-patient Department of King's College Hospital, where only children up to 10 years of age are treated, there were, amongst 1,000 consecutive cases, 229 children between 6 and 10 years old: out of these 229 cases, 13.1 per cent. showed