Remarks ON THE SURGICAL TREATMENT OF DIVERTICULITIS.

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THE figures for the distribution of diverticula in the colon have been given by Dr. Spriggs in 158 cases, as follows: pelvic colon 116, descending colon 76, ascending colon 30, transverse colon 31, whole colon 23, caecum 7. Of these 158 cases 12 per cent. had an inflammatory process associated with the diverticula—in other words, diverticulitis.

From the point of view of the surgeon the following two questions are important: (1) In what proportion of cases is diverticulosis confined to the iliac and pelvic colon? (2) In diverticulitis is the condition restricted as a rule to one limited section of the bowel, or does it usually involve a considerable length of the colon simultaneously? I put these questions lately to Mr. Marxer of Ruthin Castle, and he has answered as follows:

"In the last 100 consecutive cases of diverticulosis 16 had proceeded to diverticulitis at one or more points. In only 3 cases were the hypertrophic changes confined to the iliac and pelvic colon exclusively. In 11 of the 16 cases of diverticulitis the disease in the pelvic and iliac colon was associated with diverticulosis in other parts. In 8 of the cases less than 6 inches of bowel was hypertrophied; in the other 8 there was either more than 6 inches affected or more than one area."

These facts have a bearing on the operative treatment, more particularly on the question of resection, which I shall discuss later. In the cases of acute inflammatory colitis originating in diverticula a very long length of the bowel is usually infiltrated.

As a preliminary to the discussion of treatment it is necessary to distinguish the different clinical conditions which have their beginnings in diverticulitis, the acute and the chronic, and the sequelae or complications. These may be defined as follows:

1. Acute diverticulitis.
2. Chronic diverticulitis.
3. Acute perforative diverticulitis.
4. Chronic perforative diverticulitis.
5. Diverticulitis with stenosis.

I have seen in all 18 cases suffering from the disease. My experience agrees with that of those who find it comparatively uncommon among the industrial classes—only six of my cases were seen in hospital.

The cases may be tabulated as follows:

Diverticulitis (18 Cases).

Type.	Treatment.	Result.
Acute without complication—2 cases	1. None 2. Caecostomy	— D.
Chronic without complication—2 cases	1. None 2. Fixation and wrapping	— C.
Acute perforation; general peritonitis—4 cases	1. Diverticulum excised and drainage 2. Diverticulum excised and drainage 3. Drainage 4. Drainage	C. C. C. D.
Chronic perforation with abscess—6 cases	1. Drainage 2. Drainage; separation of adhesions 3. Drainage 4. Drainage 5. Drainage 6. Drainage	C. Four weeks. F. Fistula persists. C. Three weeks. C. Four weeks. C. Three weeks. C. Seventeen days.
Stenosis—4 cases	1. No operation 2. Short circuit 3. Colostomy 4. Resection	— C. C. C.

1. Acute Diverticulitis.

This type is subacute at the start. The patient has some vague abdominal pain which increases in severity until, at the end of about forty-eight hours, he is acutely ill with severe localized pain, pyrexia, and increased

pulse rate. On examination a large extremely tender tumour is found, usually in the left lower abdomen. The following case is typical.

A woman, aged 61, was first seen on September 14th, 1925. For a week previously she had been ill with fever, occasional vomiting, constipation, and acute abdominal pain. On examination a large tender tumour extended from the left iliac fossa as far up as the lower left ribs. The diagnosis was acute diverticulitis of the iliac and descending colon. I advised that no operation should be done unless there were definite signs of abscess. This inflammatory mass gradually disappeared. She had a slight recurrence of the condition in November, 1926. Her doctor reports to me that in January, 1927, he could make out nothing but a little thickening of the colon; further, that she had had no signs of stenosis, and that by avoiding salts and by careful dieting she had remained well up to the present.

2. Chronic Diverticulitis.

The chronic form of the disease is the commonest of all. The clinical features have been described in detail by Dr. Spriggs, and I shall take the liberty of epitomizing his account. The patient has abdominal discomfort, less often pain, in the lower abdomen at or about the navel, but especially in the left iliac fossa. General flatulence and a feeling of distension are complained of. Constipation is frequent, or irregularity of the bowels or diarrhoea, or a sense of incomplete evacuation. Occasionally there is haemorrhage from the rectum. A sausage-shaped tumour, sometimes tender, but not always, can be felt in the left iliac fossa except in the obese. The following is an example of this chronic type.

A man, aged 60, was first seen on March 23rd, 1927. This patient had had attacks of abdominal pain at intervals for about two years. The pain had never been acute. His chief complaint was total loss of appetite. There had been considerable loss of flesh, but this had not been progressive; he had been persistently troubled with flatulence. The site of the pain was in the left iliac fossa. Growth of the colon was suspected. Operation was performed on March 27th, 1927. The pelvic colon was found adherent to the parietes in the left side of the pelvis. It was freed; the condition was considered to be inflammatory and due to diverticulitis. The adherent part of the colon was wrapped in omentum, a forty-eight-hour drain was placed in the pelvis. For the last nine months he has been free from symptoms and his appetite has returned.

3. Acute Perforation.

Acute perforation may be the initial symptom of the disease. This was so in all of the four cases of perforation on which I have operated, the duration of the symptoms before operation being six hours, thirty-six hours, four days, and one week. In one case the perforation concerned the transverse colon, in one the descending colon, in the remaining two the pelvic colon. The sequelae of this accident are those which would be expected to follow a perforation at this bowel site.

In one of my cases, the transverse colon perforation, there was an unlimited peritonitis, but the operation was done within six hours and recovery followed resection of the diverticulum, cleansing of the peritoneum, and drainage.

In the second case there was also an unlimited peritonitis.

The patient was admitted to hospital after thirty-six hours; his pulse rate was 132, his temperature 100.8° F., and the abdomen showed signs of an acute and generalized peritonitis of a severe type. A perforation of a diverticulum of the sigmoid colon was found and an intense diffuse peritonitis with fetid blood-stained exudate. He died nine days after operation from persistence of the peritonitis, and ileus.

In the third case the resultant infection was more localized.

The patient was a woman, aged 44; the onset was sudden severe hypogastric pain with vomiting. On the fourth day there was an exacerbation of the pain with a pulse rate of 120 and temperature of 100.4° F. When seen she had signs of an acute peritoneal infection in the lower abdomen. A perforated diverticulum of the pelvic colon was demonstrated, the bowel having become adherent to the parietes in the pelvis; there was a large pelvic collection of fetid pus. The diverticulum was excised, the pelvis drained, and recovery followed.

In the fourth case the infection following the perforation was also localized.

This patient was also a woman, aged 39. The symptoms were a week old when she was admitted to hospital. Her illness commenced with acute pain around the umbilicus and then in the left iliac fossa; throughout the week she vomited frequently. At the end of the week she had a temperature of 101.4° F., and a pulse of 110, with signs of an acute infection in the lower abdomen towards the left side. A sloughed diverticulum of the descending colon was found and a large purulent collection in the left iliac fossa. After operation she had a faecal fistula which closed in three weeks.

The sequelae of this accident of perforation are similar to those following a perforative lesion of the appendix, the peritonitis is of a severe type and localization may or may not occur.

4. Chronic Perforation.

There is no sharply cut line between the cases of acute and the cases of chronic perforation. This group comprises those in which there is no sudden flooding of the peritoneum, where the perforation is shut off before it is complete and the typical sequel is an abscess. In fact, the group is best described as "chronic perforation with abscess," and may include the cases where no single gross perforation is demonstrated. If so, it will include all the cases of so-called "pericolicitis sinistra," the old original term. It will form the largest group which comes under surgical treatment.

Six of my cases belong to this group. One case was seen in an attack, of which the patient had had several in the previous two years. The disease was recent in the remaining five. They illustrate the variations which will arise in the clinical course according to the site of the focus and its limitation. Four of them were simple abscess evacuations in which the symptoms had been present nine weeks, fifteen days, fourteen days, and four days. Healing after evacuation occurred in seventeen days, twenty-two days, twenty-eight days, and twenty-eight days. In one case the ascending colon was the part of the bowel concerned, in the other three the sigmoid colon. The remaining two cases have points of special interest.

1. A female patient, aged 40, who had an attack of sharp pain in the lower abdomen six weeks previously. She had a second attack three weeks later, and a third a week after this. In the last attack the pain was hypogastric, she vomited several times, and the pain lasted three days. The pre-operative diagnosis was appendicitis. The appendix was healthy; a mass was found by the examining hand on the pelvic brim on the left side. The mass consisted of ileum adherent to iliac colon and on separation an abscess was opened. A perforation of a diverticulum was demonstrated on the mesenteric aspect of the iliac colon. The wound was drained, and healing took place in three weeks.

The last case of the group illustrates an important surgical point to which I shall refer later.

2. A male patient, aged 43, for two years had had short attacks of abdominal pain of moderate severity. He came under observation in the course of an attack which had lasted a month—an exceptionally long time. He was ill with pyrexia and diarrhoea. Above the symphysis pubis and to the left of the middle line was an acutely tender mass. The diagnosis was diverticulitis with abscess. At operation an abscess was found buried in a matted mass of pelvic colon and adherent ileum. A faecal fistula followed this operation and has persisted up to the present, rendering the patient unable to follow his occupation. Some months after operation the Wassermann test gave a double *plus* result, and this may have had something to do with the persistence of the fistula.

5. Diverticulitis with Stenosis.

Attacks of flatulent distension with actual colic are comparatively frequent incidents in many cases of chronic diverticulitis. Usually they are subacute and can be warded off by diet; a medical man of my acquaintance found complete relief from recurring attacks of this kind during a month spent in Barcelona eating the food of the country cooked in oil. By continuing the same type of cooking at home he has escaped further attacks during the last eighteen months or so.

There are four cases of persistent subacute obstruction from stenosis in my list.

1. A man, aged 61, in February, 1926, had an attack of constipation with distension and gripping pain. Radiological examination demonstrated obstruction of the colon at the pelvic brim. The abdomen was opened by another surgeon; no growth was found, but diverticulitis of the pelvic colon was demonstrated. Nothing further was done. I saw this patient in October, 1927; he then complained of troublesome constipation and occasional distension. The pelvic colon was tender to palpation. A further radiological examination showed diverticulitis of the pelvic colon and many diverticula elsewhere. As he had no progressive symptoms no operation was advised.

2. The second case is that of a man, aged 47, who complained of constipation varied by occasional diarrhoea, and also occasional haemorrhage, of four months' duration. The pelvic colon could be felt as an indurated and tender mass in the left iliac fossa and into the loin. Operation showed the whole length of the pelvic colon indurated with inflammatory exudate. On account of the signs of stenosis a transverse colostomy was performed. With irrigation the condition of the bowel improved, so that it was possible to close the colostomy in two months, the stenosis being relieved.

3. The patient in this case was a woman, aged 42. During the previous eight years she had had six attacks of abdominal pain, diarrhoea, and haemorrhage. The pain was hypogastric; in some of the attacks there had been vomiting. Radiologically the opaque meal was held up in the caecum and ascending colon for ninety-six hours. At operation an inflammatory mass was found in the central part of the transverse colon. An anastomosis was made between the terminal ileum and pelvic colon. Her symptoms have been entirely relieved.

4. The last case is that of a man, aged 44. He had had attacks of abdominal pain for five months. He was seen during an attack, which commenced suddenly with acute abdominal pain; there was no action of the bowels for eight days. On admission to hospital a tender tumour was palpable in the left iliac fossa. The operative diagnosis was carcinoma of the pelvic colon, and the supposed growth was resected. Examination of the specimen showed the mass to be inflammatory and due to diverticulitis. The iliac anus was closed later.

Questions of surgical treatment may be discussed in relation to these five clinical types.

I. First, in regard to *acute diverticulitis* without complication. The case quoted illustrates what I consider should be the attitude of a surgeon to this type—namely, that unless unequivocal signs of abscess make their appearance no operation should be done. There is nothing useful to do. Resection of a long length of colon would be a difficult and risky proceeding, and would have to finish with a colostomy. Isolation of the inflamed bowel by wrapping it with omentum is unnecessary, as the bowel can be trusted to isolate itself by adhesions. Lastly, any exploration for a suspected abscess would very likely result in the leaving of a faecal fistula. The one duty of the surgeon is to be on the look out for general and local signs of abscess formation. Unless this occurs the prognosis is good so far as subsidence of the acute attack is concerned. Even if abscess is suspected, delay is best; the case of persistent faecal fistula in my fourth group shows the danger attached to exploration for an abscess buried in a mass of adherent coils of large and small intestine; in this case it is true the adhesions were old and the patient a particularly bad subject, but even in recent cases the risk of serious damage to the bowel wall is considerable.

In one such case, operated on in 1921, I performed caecostomy; I have to admit that the evidence on which the diagnosis of diverticulitis is based in this case is not conclusive, but I believe it to have been an example of the disease.

The patient was a woman, aged 40, who had had symptoms for four weeks—general abdominal pain and blood in the stools. She was confined to bed during this time. The abdomen was distended and a mass was palpable in the left iliac fossa. Temperature 101° F., pulse 116. Her general condition was poor. At operation, six days after admission to hospital, the sigmoid colon was found transformed into a large inflammatory mass; there was no evidence of new growth. Caecostomy was performed. Her general condition did not improve; watery stools continued, with haemorrhage. Death occurred one month after caecostomy.

This case is no test of the value of colostomy in acute diverticulitis, but I believe this to be unnecessary. On this matter there is difference of opinion. Sir Charles Gordon-Watson has said: "In these acute cases colostomy will often be necessary"; and again, "In the absence of a definite abscess active inflammation subsides with surprising rapidity after colostomy." This is the only recommendation of colostomy as a measure to be applied in the acute cases which I have met with. It may be that it hastens subsidence, but before adopting it we shall want to know what is the prospect of subsidence in these cases without it. I suspect this prospect to be favourable, and we should, I think, be very sure that it is unfavourable before we adopt a procedure which is so distressing to the patient and which involves many weeks of discomfort before the artificial anus can be closed. Sir C. Gordon-Watson says: "After a reasonable interval recovery may be so complete that the colostomy can be closed." For some forms of infiltrative colitis colostomy is the remedy, and without it the disease cannot be controlled; but I doubt very much whether it is the right procedure in the acute colitis which originates in diverticulitis.

II. The second class of case, *chronic diverticulitis* without complication, will not often come to surgeons. The treatment has been laid down by the physicians. If such cases come to operation on account of the suspicion of new growth, there is one thing that appears to me to be worth doing. The worst of all the complications of the disease

is a bladder fistula, a complication which has been recorded in quite a number of cases. If the affected coil of colon is lifted out of the pelvis and wrapped in omentum a perforation of the bladder will not occur should an abscess form at a later period. Chronic diverticulitis without complication is not, then, a surgical disease, but if operated on for any reason the bowel should be isolated by omental wrapping and fixed in the left iliac fossa.

III. The accident of *acute perforation* is not likely to be diagnosed precisely before operation. It should be looked upon as a cause of acute peritonitis of not infrequent occurrence; one of the conditions to be borne in mind when the abdomen is opened on account of acute peritonitis of uncertain origin. It is treated on the ordinary surgical lines: the perforated diverticulum is excised and the bowel wall invaginated, drainage being provided as may be necessary. The infection is likely to be of a severe type.

IV. In *subacute and chronic perforation* it is best to wait until the abscess is well defined, and, in the second place, to confine surgical treatment strictly to the evacuation of the abscess and the drainage of its site. I am unable to offer any information regarding the prognosis of recurrence of abscess after simple drainage, a question which would be worth while following up. The danger of serious damage to the bowel wall if anything more is done than evacuation of the abscess has already been mentioned. There is not, in fact, any need to search for a sloughed or perforated diverticulum in order to obtain healing.

V. *Stenosis*, when it is certainly known to be secondary to diverticulitis, will require separate discussion in each individual case. There is no such clear indication for operation as in cancer, where it is known with certainty that the stenosis will be progressive. The study of a large group of cases of chronic diverticulitis followed over several years would be of much value. In what proportion of such cases does stenosis supervene? In what proportion of cases of stenosis does acute intestinal obstruction occur?

Mr. Lockhart-Mummery writes as follows:

"Early recognition of the disease is of the utmost importance, but if symptoms of chronic obstruction associated with the formation of a tumour and chronic sepsis are already present, I believe that immediate surgical interference is indicated and that palliative measures at this stage will more than probably result in a disaster from which it will be difficult, if not impossible, for the surgeon to extricate the patient. As in so many other diseases, one sees that the bad results following operation are almost invariably in those cases which have been submitted to operation at a too advanced stage."

The first question to answer in any given case is, Is operation required? If the patient is suffering, in spite of treatment, from recurring attacks of subacute obstruction with griping pain, distension, and constipation, then operation is undoubtedly required.

What operation is to be done? If the disease is so situated and so localized that resection is easy, then this is the operation to choose. But it may be ruled out by two different conditions: first, the disease may be situated so far along the pelvic colon that anastomosis is impossible; and secondly, the extent of bowel involved may be so great that reunion is difficult. It is all the more unjustifiable to submit the patient to an extensive operation involving risks, in that in colostomy we have not a mere *pis aller*, as in cancer, but a remedy for the disease offering at any rate a fair prospect of cure. It proved curative of the stenosis in one of my patients. In stenosis of the pelvic colon when resection is impossible colostomy in the transverse colon seems the proper thing to do. Unfortunately a short-circuit operation will rarely be feasible in view of the usual site of the disease, but will be preferred to colostomy under favourable conditions as in case No. 4 of this group.

In three cases in this group, one of which was treated by resection, one by colostomy, and the third by diversion, the necessity for operation was clear. The fourth is a borderline case in which the question of the necessity for operation is one for debate: a male, aged 61, not a good surgical risk, operated on two years ago on suspicion of growth, with symptoms of constipation and recurring griping pain with distension. The sequel is interesting as showing that the stenosis is not necessarily progressive. To-day, although nothing was done, his attacks are of less

severity, and recent radiological examination shows the stenosis definitely less marked than it was two years ago. The diverticulitis and constriction involve the distal part of the pelvic colon, but he has diverticula in the whole of the sigmoid loop and in the lower part of the descending colon; colostomy here would be the operation necessary, but as his symptoms at present show no tendency to increase in severity I advised against any surgical treatment.

At the beginning of this paper I gave the observations supplied to me by Mr. Marxer on the localization of diverticulosis on the one hand and of diverticulitis on the other; the bearing of these on the treatment by resection may now be discussed. Is resection generally applicable to cases of chronic diverticulitis without complication?

For two reasons it appears necessary to answer this question in the negative. In the first place it is reported by physicians that the patient can usually be kept in satisfactory health by diet and paraffin. In the second place, the site of the actual disease is often unfavourable for resection and the extent of the bowel involved would necessitate a very extensive colectomy in the great majority of cases. If it is true that the average patient with uncomplicated chronic diverticulitis can be kept in fair health by medical measures, a major operation which is not without its risks does not seem justifiable.

Is resection an operation to be generally adopted for cases of chronic diverticulitis with stenosis? Probably it will be employed more and more frequently in these cases; but it will always, except in a very few cases, be an extensive resection. Resection must go wide not only of the area of diverticulitis, but of any associated diverticulosis. A portion of bowel has to be chosen for anastomosis which is free of developed diverticula; this must be confirmed radiologically, as the presence of diverticula is liable to be overlooked in the course of a laparotomy in a fat-laden bowel. Mr. Marxer, in his letter, refers to one such case in which an anastomosis was made in bowel in which diverticula were present, necessitating a further excision after four years of suffering. Before the indication for resection can be settled the value of colostomy in these cases of stenosis will have to be estimated. It may be that if the bowel is kept empty by colostomy the inflammatory condition will subside and the stenosis resolve. In cases of stenosis obviously unfavourable for resection it is the method to be recommended with a fair prospect of its proving curative.

Observations

ON

ULTRA-VIOLET RAY THERAPY.*

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In this lecture I shall doubtless be expected to give a list of diseases which can be relieved or cured by ultra-violet rays, and to say how the treatment should be administered. This I shall do, but before I proceed to this part of my lecture I must give an introductory account of the rays and their action on the body. This is necessary, because the subject of ultra-violet ray therapy is far from being standardized, and although I can give some help in the selection of diseases for treatment, and some advice in regard to methods of administration, the general practitioner will frequently be confronted by cases in which he will have to use his own judgement in the treatment of patients. For the benefit of those who desire to practise ultra-violet ray therapy as a "side-line" in their general work I shall lay emphasis on methods and apparatus suitable for this purpose.

The first fact to recall is that ultra-violet rays are not all of the same kind. They differ in their wave-length, and they do not all possess the same biological chemical or physical properties. Those with the shortest wave-

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