A Clinical Lecture

ON

TWO CASES OF EXTENSIVE EXCISION OF THE COLON AND ILEUM FOR TUBERCULOUS DISEASE,

WITH SOME DETAILS OF TECHNIQUE.

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GENTLEMEN,—The removal of long tracts of the large intestine for malignant and other disease such as tubercle and actinomycosis is now a common operation and one giving excellent results, immediate and remote. And with the improved means of diagnosis which are almost daily being devised the procedure is certain to become more frequent and beneficial. But such operations are only justifiable when undertaken by those who fully realise their difficulties and dangers and who have studied their technique in every detail. So many minutiae in manipulation as well as principles have to be kept in mind all through these long operations that only careful training amounting almost to habit will prevent some of them being overlooked. I venture to think that a few notes on the technique of these procedures gradually evolved in my own work, which includes numbers of cases dealt with in various ways, may be of use to others confronted by the inevitable difficulties inherent in such procedures. And from many inquiries which have reached me on the subject I gather that it has not yet been adequately discussed. As regards the diagnosis of the essential tumours of the large intestine, there is a general feeling that this is not as closely studied as is called for, and in the February number of the *Practitioner* I tried to help in this direction. And in the matter of getting at, and of the adequate and safe removal of, different parts of the large intestine for disease we need all the personal experiences which can be accumulated. It must not be forgotten that this branch of intestinal surgery is almost exclusively the growth of the last 10 or 12 years, before which time little was seen of it. Consequently much that may now be known to individual operators is not yet common property.

ABDOMINAL INCISION.

On the point of access to the various parts of the large intestine it may be said that with the exception of the central third of the transverse colon, for which a median incision is suitable, all other segments may best be reached through an oblique flank incision on either side. This not only gives as free a field as can be obtained by any reasonable opening, but also does so with a minimum of injury to the muscles, nerves, vessels, and fasciæ of the abdominal wall. As the skin adds but little to the actual strength of the parietes it can be freely incised, and should be so especially in obese people. The cut in the skin should begin near the end of the tenth or eleventh rib and run downward and forwards nearly to the mid-line between the umbilicus and symphysis pubis. When the external oblique aponeurosis is exposed its fibres should be separated rather than cut, and the same may be said of the two deeper muscles. It is surprising what a wide opening can be obtained in this manner without actually dividing the fibres of the muscles in question. The nerves which supply the rectus, the oblique, and the transversalis muscles are also preserved intact with a little care and very few vessels are cut. The innervation and blood-supply of the abdominal wall are by these means preserved and its future strength is unimpaired. If the opening is not large enough when it reaches the sheath of the rectus this may be opened and the belly of the muscle be drawn inwards without difficulty, still further enlarging the aperture. At this stage the aim should be to gain adequate room without spoiling the abdominal wall. Vertical incisions *outside* the rectus sheath are unsuitable in these cases, the tissues, owing to the direction of their fibres, giving but little hold for any form of subsequent stitching and tearing apart easily if there be any vomiting or coughing. Besides this, the nerves

and vessels must be cut by such incisions, as they run downwards and inwards.

THE LOCAL AND GENERAL CONDITION.

Assuming now that on opening the peritoneum in the line described it be found, as was the case in my two last cases, now convalescent, that the upper part of the ascending colon, as well as the cæcum, are extensively involved and call for removal, what is the next step? This is largely determined by the local condition and the patient's strength. If it be found that the diseased area is sufficiently localised to justify an attempt to remove it at one sitting, this may be set about at once *provided there is no extreme obstruction* and that the last part of the ileum is normal or hypertrophied, but is otherwise healthy. On the other hand, if the ileum is found pained, distended, and congested, and loaded with liquid fæces, no attempt at extirpation should be made at the moment. Suture of a bowel, paralysed, livid, and soaked with toxins, is almost certain to end in failure of union at the point of suture of the intestine, even if it can be accomplished without the escape at the moment of some of the acrid fæces or foul mucus. A careful distinction must therefore always be made between the thickening of the ileum owing to compensatory hypertrophy and that due to cedema from toxins absorbed from fermenting foul fæces. In the first case the bowel will probably be of normal colour and texture and not much enlarged; in the latter its lumen will be much increased and it will be cedematous, injected, or even livid and softened. If it be in this condition a loop should be drawn out of the inner angle of the wound and the latter closed completely around it. If the patient's general condition permits, this loop should not be opened for some days, when it may be incised, and a Paul's tube inserted for drainage, which must be kept up until the whole small intestine has been emptied and the bowel has returned to a healthy condition. This is accelerated, I think, by the administration of bismuth carbonate in 10-grain doses three times daily. Of the antiseptic value of bismuth in intestinal cases, as in others, I have no doubt from large experience; indeed, it is my routine to employ it. When the colour of the motions coming from the faecal fistula has been continuously altered by the drug, and they have become otherwise normal, we may begin to prepare for the excision of the diseased portion of bowel. In cases of subacute or chronic obstruction where operation is not urgently demanded I believe also that the daily use of bismuth carbonate greatly improves the chances of asepsis during the subsequent removal of the growth. It is taken for granted that every expedient is employed at the same time to unload the bowels. But such attempts should cease at least a couple of days before the operation.

ONE SITTING, OR TWO?

When there is no acute or subacute obstruction the problem is fairly simple, as we are going to work on healthy bowel more or less empty. But we have yet to decide whether to do the operation in two stages or at one sitting; in other words, should a short circuit between ileum and colon be first made and then, after an interval of two or three weeks, the excision of the diseased bowel be undertaken, or should the latter follow *at once* on completion of the anastomosis of the bowel above and below the part to be removed? As a matter of fact, I have accomplished the end in view in both ways many times over quite successfully. On general grounds, if a patient is in fair condition, the procedure in one sitting is much to be preferred. The relief to the sufferer's mind of having the whole affair over at once is great, and, conversely, the apprehension of a second operation after the first is often very depressing and a prospect which all will not face. Nevertheless, the amount of time which is required for the double procedure, junction and excision, which will be on an average two hours (my last required one and three-quarter hours), is a matter of gravity which cannot be overlooked in view of the anæsthetic and the prolonged exposure and manipulation of the viscera. I have been amazed, however, in several cases to see how little ill-effects have been produced by the double operation at one sitting even when of the longest. My last case had little or no shock; another earlier one in which the condition was complicated by a faecal fistula in the cæcum, and which lasted two and a quarter hours, showed absolutely no ill effect from the prolonged operation, and is now, after

more than two years, in splendid condition. Personally I am inclined to rely for guidance on this point on the following factors. If there are no signs of toxæmia and the bowels to be anastomosed are healthy; if there are no wide-reaching adhesions, and the patient's general condition is good when the short circuit has been accomplished in a reasonable time, the excision should immediately follow. Cases of marked toxæmia with distended proximal bowel are, of course, excluded; they must be treated, as already stated, by artificial anus and evacuation for a time. In many cases of less distended bowel and only slight evidence of absorption of toxins it is better also to make two stages of the procedure—that is, if it should be undertaken at all without previous drainage by artificial anus. Towards the completion of the short circuit, then, the patient's general condition should be carefully considered by surgeon and anæsthetist, and if satisfactory the immediate excision may follow.

DETAILS OF PROCEDURE.

There are several details in the performance of the junction of the small intestine proximal with the large distal to the diseased area which are of special importance. The point to be selected in each comes first. In the proximal *healthy* small bowel the lower down the junction is made the better. In the first place general nutrition is less deranged, and in the second there is less mesentery to be taken away, time and blood being thus saved. In the case of the colon there should always be a wide interval between the diseased portion (whether cancerous or tubercular) and the spot distal to it selected for the junction with the ileum. This view is based upon the known wide distribution of the disease along the submucous lymphatics proximal and distal to the infected part so admirably demonstrated by Handley and so often hitherto the cause of recurrence in our older cases. There should be no hesitation in selecting a spot in the colon 6 or 8 inches or more beyond the palpable and visible infiltration. Any closer will in many cases, at all events, fall within the area of infection.

TECHNIQUE.

When the spot for junction has been selected each part of the bowel is drawn out and emptied by pressure with the fingers. Then they are clamped longitudinally, either singly or, if possible, side to side with a Doyen's forceps. (N.B.—The blades of these instruments are often made too powerful by many manufacturers, and if so may injure the bowel.) Every part of the wound and between and around the coils and clamps should now be packed with one *continuous* long strip of sterile gauze from an uncut roll. Then the two coils are united for at least 2½ inches longitudinally at about a third of an inch from the middle of one of the tæniæ, a long "tail thread" being left at the end opposite to the needle. The latter and its thread are then covered for the present by a turn of the gauze roll to preserve it from contamination later. The thread I have employed for the whole procedure for many years is of fine linen. (Barber of Lisburn, Ireland, is the spinner of this material for Singer's sewing machines; No. 90 is the strength used.) This suture is carried by an ordinary sewing needle. The "side threading" pattern, 2 inches long, is the most convenient. It is now stocked by Meyer and Meltzer, of 71, Great Portland-street, W. The sero-muscular union being now half made the opening in one bowel is cut, for 2 inches or so, through the tænia in the case of the colon. This is best done with scissors, and the length of the hole should be the same as that subsequently made in the other. Great care is necessary in making these openings to avoid soiling the wound with the contents of the bowel. This is always a most anxious part of the operation, for, in spite of the emptying of the gut before clamping, there is always at least infected mucus within it. This is best removed with small rolls of gauze held in forceps, fresh material and instruments being used each time. Then the opening in the other coil is similarly made and cleansed. It, too, should be about one-third of an inch from the sero-muscular suture previously half made. Personally I have an objection to using any lotion or even sterile saline at this stage lest any of the fluid mixed with fæces or mucus should run down over the edges on to the intestine; dry gauze is certainly cleaner. This is a far more serious matter than the cleansing of a gastro-enterostomy junction, but can be accomplished with practice as results show.

A second needle with the same sized (No. 90, Barber's scale) thread is now taken, and at the opposite end at which the first sero-muscular suture was begun is made to transfix all the coats of both bowels at about one-eighth of an inch from their edges and is tied, leaving a long "tail thread." From this point the needle and thread are carried over the cut edges of both bowels and again passed through all their coats about a quarter of an inch from the first, and so on until the two edges are united from end to end by a continuous overcasting suture. Then the corner is turned, the greatest care being taken that the serous edges are accurately coapted without the intervention of any mucous membrane. When this continuous suture has thus brought opening to opening all round the suture is completed by tying the "needle thread" to the "tail thread" at the point of departure. Then the whole line of suture is carefully wiped clean of any mucus which may have been squeezed out. Wet swabs are undesirable except in special cases. The sero-muscular suture is now completed with the needle and thread which has been covered from contamination during the "all coat" suture. The whole area involved in the junction should now be carefully wiped front and back after release of the clamps and all traces of blood removed. The long continuous strip of gauze is now taken away, and being in one piece there is no danger of any of it being left behind in the abdomen. Round the anastomosis it is now well to wrap a fold of omentum and secure it with a few interrupted sutures.

By this time it ought to be apparent to both surgeon and anæsthetist whether the patient's condition is such as to justify the much longer and more severe operation of extirpation of the segment of bowel including the disease. But it is a nice question to decide, and on the whole it is better to err upon the safe side and to divide the procedures into two operations than to make too great a claim upon the patient's endurance at one sitting. The judgment even of the experienced operator will, of course, be at fault occasionally; nevertheless, experience will tell almost as much as skill. The advantage to the patient of getting over the whole undertaking at once is so very great, however, that some risk may be taken. Feeling thus, my own preference in making the preliminary ileo-colostomy in the majority of cases is for a "side-to-side" anastomosis which reduces the chances of infection from the bowel. In it there are no turned-in stumps of intestine left about which we need be anxious and the procedure is shorter. But where on careful exploration of the growth and its surroundings in a patient in good general condition an extirpation in one sitting seems justifiable, there can be no doubt that to join the end of the divided ileum to a slit in the side of the colon is the quickest and safest procedure. Here there is no blind stump of ileum left in the abdomen, the stitching of which would have prolonged the operation and increased the risks of infection. There is, of course, the divided stump of the ileum in the part to be taken away. But this will be securely clamped, wrapped in gauze, and immediately lifted out of the abdomen and further enveloped in sterile towels out of the way of contact with anything which could infect the peritoneum or the wound in the abdominal wall. This "end-to-side" ileocolostomy is commenced by a sero-muscular suture between the undivided ileum and colon, which includes half the circumference of the opening. Then the ileum is clamped with two pairs of Doyen's clamps, the first close against the line of suture just made and the next half an inch below the first. Between the two the ileum is cut across as close to the first pair as possible. Then the cut surface of the partly sutured ileum is wiped clean and covered with gauze for the present, the clamp on it being removed. The other end with the clamp still firm is wrapped in gauze, and the mesentery belonging to it is divided between ligatures until the bowel can be well drawn out of the abdomen and wrapped in sterile towels for the present. The gauze is now removed from the partly sutured end of the ileum, its open end again cleansed, and a corresponding opening is made in the colon through one of the tæniæ, the edge of the cut being about one-third of an inch from the previously made sero-muscular suture line. Then the "all coat" suture is made uniting the two corresponding openings between ileum and colon as previously described. When all round has been wiped clean the sero-muscular suture is completed and tied to its tail thread. In cutting across the ileum care should be taken to remove more of the free

margin than of that attached to the mesentery. The blood-supply of the free margin is by this means more certain to be adequate. This rule holds for all transverse divisions of the bowel in any part of its course, large or small. If now the patient's condition is *not* good the distal end of the ileum above the ileo-cæcal valve can be turned in and sutured, cleansed and returned into the abdomen, or may be left hanging out of the wound unsutured but enveloped in gauze drawn round it with a tight strong thread, the rest of the procedure being deferred.

But the patient may be in good condition as regards blood pressure, respiration, &c., and it may be felt that the whole procedure of extirpation may be best completed at one sitting. If this be so the original gauze packing in one continuous piece such as I have always used is removed with no danger of leaving anything behind. It is otherwise if short pieces are employed. It is very easy to overlook one of them, especially when soaked in blood-stained serum. No detached small piece of gauze should ever in my opinion be allowed within the abdomen or other large wound which is not immediately taken out. The wound is now packed off again with a fresh gauze roller paid into it, while the still unrolled part is placed in a sterile box or towel on the abdomen. What is soiled can be from time to time withdrawn and cut off, while a fresh part is inserted from the roller. When the whole field of operation has been thus freshly guarded the peritoneum reflected from the cæcum and ascending colon to the parietes should be divided with scissors, one blade of which is inserted under it. There are few or no vessels to be considered here and no time is lost. This only becomes an anxious matter in the neighbourhood of the kidney, duodenum, and ureter, when the whole cæcum, ascending colon, and part of the transverse has to be removed, as was the case in the two patients to be referred to. When the peritoneum is divided great care must be taken to remove all glands and the surrounding areolar tissue in which the lymphatics run, together with the affected bowel.

The whole of the involved intestine from the ileo-cæcal valve to the anastomosis is by this time mobilised, and the inner part of its mesentery, which contains its vessels and lymphatics, can be well defined when stretched. The vessels must be carefully secured far from the intestine, but with great care not to include the superior mesenteric or trunk of the middle colic. The right colic can be tied off an inch from its origin, but the middle colic should not be ligatured until after it has given off its left colic branch, so that the anastomosis with the left colic of the inferior mesenteric be not interfered with. The corresponding veins will also require ligatures, and the fat and lymphatic tissues should be tied off with them.

By this time the whole ascending and part of the transverse colon are detached and the tube can be cut across an inch and a half from the previous junction with the ileum. This should be done between two Doyen's clamps placed close together, but not before a fresh turn of the gauze roller has been placed under the point of division. The separated portion containing the disease is carefully lifted away with all due safeguards as to avoidance of soiling with the fresh cut stump held in the clamp. The remaining proximal stump still held in the clamp is carefully cleaned and a second clamp is put on the bowel proximal to the first, and gently closed. Then the first, which should have been tightly applied, is removed, and the edges, which are found flattened together, are overcast easily with a suture. Having again been wiped over, the Doyen is taken off and the line of sutured bowel is pushed into the lumen beyond and a continuous sero-muscular suture applied to retain it there. The stump is cleansed again and the gauze packing removed in one strip.

It only remains now to revise the whole field of operation, close all bleeding points, remove any clots and loose shreds of fatty and areolar tissue, and suture the wound in the abdominal wall. This, as a rule, can be done completely at once in layers. If the packing has been carefully carried out from beginning to end, the edges—serous, muscular, and cutaneous—will be clean, and primary union will be obtained. But there may be a doubt on this point, in which case the wound is better only *partially* sutured over a gauze packing left in for 24 hours. But it is an enormous gain to the patient to get over the whole procedure once for all, and careful packing and manipulation will secure a degree of asepsis quite compatible with primary union. The earlier

operations included drainage as a rule, but this was found to prevent in some cases the coaptation of the serous surfaces round the anastomosis and stumps, and the proper deposit of lymph around them, so that not infrequently a slight faecal fistula was the result. This almost certainly closed in a short time, but was a blemish on the operation. Now with greater command over the technique of aseptic removal and immediate and complete closure of the abdominal wound such leakages are rare and primary union is the rule. If such is the case the after-treatment is simple. Fluid diet in small amount can be taken from the first day onwards, and after the bowels have been moved naturally, as they will be in a few days, semisolid and later full diet.

The cases alluded to in the title of this lecture appear in several ways as deserving of record, and particularly as illustrating the method of operation described. They have a further bearing upon the whole question of tubercle of the intestine and its treatment, which, however, is too large to be dealt with here.

CASE 1.—The patient, an unmarried female, aged 40, was sent to me in a very emaciated condition on account of a faecal fistula in the right groin, dating from an operation for faecal abscess about one year before, assumed to be due to appendicitis. At the operation a suspicion, I was told, arose that tubercle was at the root of the matter. Besides the faecal fistula a large mass occupying the whole cæcal region could be made out when I came to examine the patient.

On June 25th, 1908, under spinal analgesia, I included the scar and fistula between two curved incisions and then stitched the two included skin edges over the fistula, using the threads besides to tie a thick layer of gauze over this to prevent any soiling of the subsequent deeper wound. Then the two incisions were deepened into the abdomen. It was then seen that the whole cæcum and most of the ascending colon were involved in advanced tubercle. Besides this, the last 18 inches or so of the terminal portion of the ileum were studded with tubercles as large as small peas (*vide* illustration). The cæcum was mobilised as above described, but with the greatest difficulty owing to very dense cicatricial adhesions all round and to the omentum. During the necessary dissection the cæcum gave way, but the hole was clamped, wiped, and enveloped in gauze. The hepatic colon was clamped, divided, and its end turned in and sutured. The ileum was now cut across over two feet from the valve and the whole tuberculous bowel with its mesentery and many infected glands removed from the abdomen as above. Then the end of the ileum was planted into the side of the transverse colon about two inches from its closed end. The whole procedure was a most complicated one owing to adhesion, infiltration, and glandular infection as well as the difficulty of determining how much of the ileum should be taken, for many small tubercles were scattered widely and I have no doubt that some were left behind above the line of junction. The wound was almost closed, but as there was some justifiable doubt as to the whole of the operation having been carried out without infection from the fistula and from the tear of the cæcum I thought it better to put a gauze drain into the upper angle. This was removed in a few days, but a sinus remained at the spot for a long time until the patient went to the country. Otherwise the rest of the wound healed perfectly. The operation lasted for 2½ hours, but the anaesthesia was absolutely satisfactory to the surgeon and to the patient, who had expressed a wish to escape from chloroform. There was no sickness and no shock.

The parts removed (*vide* illustration) are thus described in the hospital surgical registrar's notes. "Cæcum with 4 inches of colon and 27 of ileum. Colon where cut through fairly healthy, though thickened and showing numerous tubercles on its peritoneal aspect. There is some ulceration of the mucous membrane, especially towards its lower end, where the whole circumference is ulcerated. Cæcum a mass of fibrous tissue, the walls $\frac{1}{4}$ to $\frac{1}{2}$ inch thick and very rigid; lumen very small, mucous membrane greatly ulcerated, especially round the stump of the fistula. Some inches above the ileo-cæcal valve the lumen of the gut contracted by thick, fibrous material to such an extent that it will not admit the little finger. Above this in the ulcerated colon are five plum stones. The ileum shows numerous ulcerations of the mucous membrane, some healed, many recent, and encircling the bowel. About 22 inches up the ileum is a healed ulcer contracting the bowel. At the cut end the ileum, though thickly studded with tubercles, is

fairly healthy, showing no recent inflammation or ulceration."

I have recently seen this patient nearly three years after operation. She is plump and ruddy, and the bowels act regularly. Her local and general condition, in short, appears perfect, and her high spirits are remarkable.

CASE 2.—The patient, a soldier, aged 32, was sent to me as a case of probable carcinoma of the ascending colon. The diagnosis was based on a history of chronic intermittent obstruction and wasting with tumour in the flank, and on the discovery of a tumour from cæcum to hepatic flexure with infected glands during an exploratory laparotomy in December, 1910. Nothing further was done then and the wound was closed and healed per primam.

On admission, Jan. 23rd, 1911, the tumour, though large,

easier than usual, but time had been lost in the examination of the relations of the tumour, and it was thought better to postpone the extirpation of the disease until a later period. At the end of a fortnight all was well, and the bowels had been thoroughly unloaded naturally through the anastomosis. The wound, which had healed per primam, was again opened up, and the last part of the ileum, cæcum, ascending and part of transverse colon up nearly to the anastomosis were excised with the same details as above. There were extra difficulties in this case in dissecting the mass from its adhesions with the liver, kidney, and duodenum, and in extirpating the widely infected glands. But in the further course of the case there is nothing to note except perfect recovery. There was no drainage, and the wounds healed without a flaw.

a, Divided ileum. b, Divided colon. c, Ileo-cæcal valve. d, Contracted portion of cæcum. All parts studded with tubercles.

appeared to me to have increased, but slowly, and the general condition to be less serious than might be expected in a young man who was known to have obstructive symptoms from tumour (presumably malignant) since at least the previous October. It appeared probable that the disease and the wasting might be due to tubercle, and this view gained support from the presence of tubercle bacilli in the sputa and the physical signs of dry phthisis in the right apex. The hope was justified that the symptoms might be due to a tubercular mass in the walls of the colon, as in the last case, and the glands only infected from this. After due preparation the same oblique skin incision was made as above, the muscle fibres separated, and the abdomen opened. The mass felt consisted of cæcum, infiltrated ascending colon, and hepatic flexure and glands obviously infected but not carcinomatous. This mass was widely adherent by fibrous bands to the border of the liver, kidney, and duodenum, and the omentum was also extensively adherent to it. The diagnosis of tubercle having been confirmed at once by a microscopic section of a gland, a lateral anastomosis of ileum to middle of transverse colon was made and the wound was closed. Spinal analgesia made the operation much

When the man came back from the seaside to report himself he was in rude health, could eat any diet, and his bowels acted normally. The tubercle bacilli had disappeared from what he coughed up.

DONATIONS AND BEQUESTS.—Subject to certain legacies and conditions the Glasgow Royal Infirmary, the Western Infirmary, Glasgow, and the Victoria Infirmary, Glasgow, will receive about £40,000 each under the will of the late Mr. J. S. Dixon. The Glasgow Sick Children's Hospital will receive about £20,000.—The late Lieutenant-General Mostyn de la Poer Beresford has bequeathed £1000 to the Free Home for the Dying, Olapham Common.—The executors of the late Captain Ralph Slazenger have allocated £1000 of the £2000 left for charitable purposes for the endowment of a bed in King Edward VII. ward of the Royal National Orthopaedic Hospital.—By the will of the late Mr. Edmund B. Gibson the Saffron Walden Hospital will subsequently receive £500.