of some highly-organized establishments where if one of the servants is incapacitated it is no one's place to do the work, which is consequently left undone.

I have already mentioned that the flexors of the fingers take part in the flexion of the wrist, and they do so very readily. It is also to be noted that when the flexores digitorum act as flexors of the wrist the synergic action of the extensores carpi does not occur. When, however, we cause the fingers and thumb to contract powerfully, as in grasping, and while this is occurring we flex the wrist, we get an entirely different condition. Here we have taking part in the movement of grasping the flexors of the thumb and fingers, and also the synergic action of the extensores of the wrist, and the question is, What will happen if we now flex the wrist? Will the movement be done by the flexors of the fingers, or will the flexors of the wrist come and help? And, lastly, will the extensores of the wrist relax? It will be observed that if this movement be attempted while a strong grasp is maintained, and also if the flexion of the wrist be made slowly, there is a considerable feeling of strain, and a certain amount of tremor due to the antagonism between the acting muscles.

To determine the three above-mentioned points the following method was used:

1. It was first necessary to ensure that the grasp of the hand was being maintained throughout the observation, and this was done by means of a dynamometer, which was grasped in the hand, and the index of which could be watched, for I found that in flexing the wrist against resistance as soon as the grasp was relaxed the flexors of the wrist immediately contracted, even in the slightest degree of flexion, and, as I have already mentioned, the whole experiment depended on the grasp being maintained.

2. The forearm was put in the position midway between supination and pronation, and a band was passed round the metacarpal bones, and either traction was made horizontally in the direction opposed to flexion of the wrist, or flexion was made by the wrist against a fixed point; a spring balance was attached to the band, and the amount of traction was read off at which the tendons of the flexors of the wrist were felt contracting, and also the amount of traction required to make the tendon of the extensor carpi radialis relax.

In my own case I found that the tendon of the palmaris longus could be felt first when the balance measured 3 lb., whereas the tendons of the flexores carpi radialis and ulnaris were not felt till 5 to 6 lb. traction was made. On the other hand, the tendon of the extensor carpi radialis was not felt to relax till as much as from 14 to 16 lb. traction had been made.

The strained feeling would therefore seem to be due to the antagonism between the extensores of the wrist and the flexors of the wrist.

These experiments show that the combination between the extensores digitorum and flexores carpi, and also between the flexores digitorum and extensores carpi, is so strong that the muscles which flex and extend the wrist will oppose each other rather than sever their connexion with the finger muscles, when the wrist is being extended or flexed in conjunction with extending the fingers or flexing the fingers and thumbs.

While discussing the question of the action of the extensores of the wrist with the flexors of the fingers, it will be advisable to say a few words about the nature of this combination. Duchenne calls attention to the definite association between the above-mentioned muscles, as well as that of the extensores of the fingers and flexors of the wrist, and that of the extensor ossis metacarpi pollicis and the extensor carpi ulnaris. He speaks¹ of the "moderating synergy," and he describes

that the synergic contraction of the flexors of the hand on the forearm is inseparable from the muscular function which ought to produce voluntary extension of the first digital phalanges. To place the common and special extensores of the fingers in the greatest elongation in order to augment their dynamical power: such is the useful end of this instinctive combination of the flexors of the hand during extension of the fingers.

He refers to the over-extension of the wrist which occurs in extending the fingers when the flexors of the wrist are paralysed, and the explanation which he gives is that "the common extensores of the fingers, being up to a certain point at the same time extensores of the hand on the arm, their contraction renders necessary the moderating synergy of the flexors of the wrist." One of the earliest mentions that I can find about a muscle passing over two or more joints is that of William Cowper who¹⁶ reproduces Bidloo's splendid anatomical plates. He gives various reasons for this occurrence, but he does not mention the bringing in of other muscles. John Hunter¹⁷ in his second Croonian lecture delivered before the Royal Society in 1777, was, as far as I can ascertain, the first to enunciate the doctrine of synergic muscles. He says: "Muscles often go over two, three, or four joints, and only

move the third and fourth, as the flexors of the last joints of the fingers; but to prevent the first and second joints being moved by this action the extensores of the intermediate joints are obliged to interfere and keep them bending." This is really the use of these synergic muscles, and although the flexors of the wrist do act in placing the extensores of the fingers in the greatest elongation in order to augment their dynamical power, and to such a degree that when the wrist is flexed to a right angle the grasp is about one-half what it is when the hand is in a line with the forearm, that I think is not their object. For if the wrist be extended passively as far as it will go, and if then the fingers be actively extended, the flexor carpi ulnaris will still be felt to contract without remedying the position of the wrist-joint, even though the extensores of the fingers are working at a great disadvantage. Surely if the function of the synergic muscles was to put the extensores of the fingers in the most advantageous position, they would flex the wrist and bring the hand into the position in a line with the forearm. Their function appears to be to fix the wrist in whatever position it is required to be, so that the fingers will have a secure basis to work upon. Following the opinion cited above of John Hunter, I think the condition may be stated thus: When a muscle by passing over two or more joints has two or more different actions, then, if only one of these actions is required, other muscles are brought into the movement whose actions are antagonistic to those of the muscle which are not required. In the above quoted case the extensores of the fingers, by passing over the wrist, are extensores of the wrist as well as extensores of the fingers, and as extension of the wrist is not required the antagonists to this action, namely, the flexors of the wrist, are brought into the movement, and the resultant movement is extension of the fingers without extension of the wrist. This rule applies, as far as I have been able to observe, throughout the muscular system. These muscles, which are brought into action to neutralize an action which is not required, I should propose to call "synergic muscles," a term used by Duchenne.

REFERENCES.

- ¹ *An Anatomical Exposition of the Structure of the Human Body*, by James Benignus Winslow. Translated from the French original by C. Douglas, M.D. Fourth edition. Corrected. 1756. ² Loc. cit., vol. i. Sect. III. No. 566. ³ *The Works of John Hunter, F.R.S.*, 1837. ⁴ *Physiologie des Mouvements*, 1867, p. 164. ⁵ Loc. cit., §§ 168, 169. ⁶ Loc. cit., § 216. ⁷ Loc. cit., p. 315. ⁸ Loc. cit., p. 316. ⁹ Loc. cit., § 158. ¹⁰ Loc. cit., § 218. ¹¹ Loc. cit., p. 157. ¹² Loc. cit., p. 149. ¹³ Loc. cit., p. 165. ¹⁴ Vol. II, p. 949. ¹⁵ Loc. cit. p. 161, § 69. ¹⁶ *Myotonia Reformatia*, 1724. ¹⁷ Loc. cit., p. 238.

Observations

ON

THE TREATMENT OF CANCER OF THE RECTUM.

By W. WATSON CHEYNE, M.B., F.R.S., C.B., ETC.,

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THE treatment of cancer of the rectum practically resolves itself into three alternatives, namely, (1) to leave the disease alone; (2) to perform colotomy; or (3) to remove the affected portion of the bowel. I may say a few words on each of these points.

1. Where the disease is left alone, the treatment consists in the relief of symptoms as they arise, and the adoption of a variety of palliative expedients, such as local injections to keep the part clean, laxatives to keep the bowels open, scraping away the fungating masses if they are causing obstruction, opium, etc. There is no doubt that a certain number of cases get on very well on these lines; and so long as the disease has not spread to neighbouring organs or involved nerves, such as the sacral plexus, the patient is in many ways more comfortable than with colotomy, because he still retains his sphincter and is able to go about. The cases suitable for this kind of treatment are those where there are fungating masses, chiefly growing from one side of the rectum, as distinguished from those in which there is an encircling and constricting growth.

2. Colotomy. This removes the risk of obstruction. It may also relieve some of the symptoms, such as tenesmus and the pain due to the passage of faecal material over the

raw surface, and it is of great value where other organs such as the bladder are involved. It is also strongly held by some that the operation of colotomy may delay the spread of the disease, that just as the rectum tends to atrophy after the operation so the disease that is growing in it may do likewise, the more so as it is no longer irritated by the constant passage of faecal material over it. I must confess that I have not been able to convince myself that colotomy has any very marked effect in leading to arrest of the growth of the cancer, and I certainly should not advocate its performance in a case where that was the sole or chief reason that could be urged in its favour. On the other hand, colotomy does not stop the severest form of pain which occurs in these cases, namely, that due to involvement of the sacral plexus, nor does it avert, although it may diminish, the troubles due to extension of the disease to neighbouring organs. It is a very disagreeable alternative to sensitive patients and it makes even a strong man more or less of an invalid. Most patients dislike the result extremely and I have heard more than one say that had they at all realized what it meant they would have refused to have had it done. In fact, when performed comparatively early in the disease—when of course it is most safely done—patients, not realizing what it has saved them, are very apt to look on it as an unnecessary and serious addition to their troubles and to reproach their surgeon for having prolonged their existence by this means. The chief point for discussion is, I think, the period at which colotomy should be performed and in my own opinion, while it frequently gives great relief to the patient and prolongs his life, it should not be performed in the early stage while the patient is still comparatively comfortable.

3. In marked contrast to these two methods, which after all condemn the patient to die of his cancer and only try to prolong his life and make him somewhat more comfortable, we have the third procedure in which an attempt is made to rid him of his disease. Opinions differ very much as to this question of excision of the rectum, some rejecting the operation almost entirely, while others go to the other extreme and advocate it even in very advanced cases. The majority of surgeons, however, agree as to the value of the operation when performed in suitable instances.

The answer to the question of radical treatment depends, in the first instance, on what the probabilities are of getting rid of the disease by excision, and, in the second place, on the risks which will be run in the attempt. Many papers have been written advocating colotomy as opposed to excision and vice versa, but the footing on which each stands is entirely different. Colotomy leaves the patient with his cancerous rectum and is merely a palliative operation, while excision aims at ridding the patient of his disease. It seems to me that if by excision of the rectum in any individual case we can feel that there is a fair probability of ridding the patient of his disease, at any rate for a considerable period, and if that can be done without undue risk to life, this operation should be proposed to the patient, and under such circumstances there can be no discussion as to whether he should have excision or colotomy done. Should he decide against excision of course the position is altered, but so far as the surgeon is concerned I fail to see where the contrast between the two operations comes in. The case is either suitable for excision or it is not.

Two questions therefore arise with regard to excision of the rectum for cancer, namely (1) the value of the operation as a radical procedure, and (2) the risks which it involves. In many cases of cancer situated elsewhere, no one hesitates to carry out a radical operation with the view of prolonging life or even of getting rid of the disease entirely. And the question here is whether cancer of the rectum falls into line with cancer in other situations; whether favourable results as regards non-recurrence may also be expected from excision of the cancerous rectum, or whether the results are so bad that they do not compensate for the risk.

Now in the rectum, as in the intestine generally, the form of cancer which occurs is probably in the majority of cases more slowly growing than cancer in a good many other places, notably in the tongue; and were it not for the obstructive troubles which are so apt to follow, the length of life of a patient with intestinal cancer would compare very favourably with that of patients with cancer of the tongue. Hence in the majority of cases there is nothing inherent in the form of cancer which occurs in the rectum that is against an attempt at a radical operation. Nor is there anything in the situation which renders complete removal of the disease particularly difficult in suitable cases. The greater part of the

rectum is comparatively easily accessible from below, and the whole of it can be reached by a combined abdominal and perineal operation. The lymphatic glands run in close contact with the intestinal wall, and, provided that the operation is done at an early period of the disease and that the glands are comparatively slightly affected, the disease is readily enough removed. As a matter of fact, experience shows that a very considerable proportion of patients in whom excision of the rectum has been performed for cancer remain well for a long time. In my own experience I have a number of patients remaining alive and well, as far as one can tell, for periods extending up to nine years since the operation, and in published statistics of other surgeons very satisfactory results are also recorded. I have not had time to work out exact statistics in this matter, but in Kocher's statistics, published some years ago, he had 28 per cent. of cases operated on from three to sixteen years previously which showed no recurrence. I have no hesitation in saying that, as regards the question of removal of the disease, cancer of the rectum shows in suitable cases a very fair percentage of recovery as compared with cancer elsewhere.

It appears, however, that in cancer of the rectum the proportion of suitable cases which come under observation is less than, for example, in cancer of the breast, of the extremities, etc. In fact, when I wrote the Lettsomian lectures and went into this matter carefully, I calculated that only about 20 per cent. of the patients as they present themselves to the surgeon will be found to be suitable for a radical operation from the point of view of the probability of the complete removal of the disease; possibly with the recent improvements in the operative procedure this percentage might be somewhat increased. I may point out, however, that, apart from complete recovery lasting several years, the operation may, even in cases where recurrence takes place elsewhere, prolong life and save the patient an immensity of suffering. Provided the recurrence does not take place actually at the divided portion of the bowel, the patient is often considerably benefited, because he escapes the obstructive troubles just as he does after colotomy; and he has this advantage over colotomy, that he also escapes the extension of the disease to other pelvic organs with its accompanying suffering; in fact, he probably lives longer and dies in a much less distressing way than if the cancer of the rectum had been left alone and colotomy performed.

As regards the mortality of operations for excision of the rectum, it is no doubt much higher than the mortality after operations through unbroken skin, such as amputation, excision of the breast, etc.; in the latter cases the mortality is extremely slight—probably under 1 per cent.; whereas in cancer of the rectum the mortality ranges from 5 to 30 per cent. In different statistics, I should reckon the mortality of excision of the rectum as from 5 to 10 per cent. as the result of recent improvements in the operation. Hence my own opinion as regards excision of the rectum, from the point of view of whether it is worth doing or not, is that in suitable cases it is a very valuable procedure, and that the risk run by the patient is not at all in excess of what ought to be run seeing the advantages which may be gained.

The next question, therefore, which arises is this: Is the particular case under consideration suitable for radical treatment or not? The indication for radical treatment is an extremely important point for discussion, and it will be very valuable to hear the opinion of the Fellows of the Society on this matter, as well as to learn their experience of the results of excision both from the point of view of removal of the disease and of the danger of the operation.

I may state my own opinion as regards the suitability of cases for excision as follows: I need not go into the question of how far the general condition of the patient affects the decision, because I presume all surgeons will be agreed that operation is only to be undertaken in patients who are in a fair state of health, who are likely to stand a severe operation and, it may be, a prolonged convalescence, who are not suffering from any other organic disease, and in whom there are no evidences of extension of the malignant disease to other parts of the body.

As regards the local conditions which have to be taken into consideration, the question practically is, Can we or can we not remove the affected portion of the bowel with a good chance of its not recurring at least locally? The chief local contra-indication to my mind is the fixity or otherwise of the affected portion of the bowel. Once the bowel becomes fixed we know that the disease has infiltrated the whole thickness of the rectal wall, and has begun to spread into the surrounding

tissues. Under those circumstances we no longer have to deal with disease confined more or less completely within a tube, but with disease which has escaped from its definite limitations, and which may be spreading far and wide beyond what we can detect either by palpation or by sight. Hence, in my opinion, anything like distinct limitation in the mobility of the affected portion of the intestine is a contraindication to an attempt at a radical cure. This, however, is a point on which it will be very important to hear the experience of the Fellows of this Society, for some surgeons do not take such a rigid view of the matter as this, and do not hesitate to operate even when the disease has passed through the wall of the rectum and has infiltrated neighbouring structures, such as the prostate, the wall of the bladder, etc. One exception I might make to this question of adhesion, and that is where a tumour situated low down become adherent to the posterior wall of the vagina. Where such adhesion is comparatively slight, I have in more than one case removed a V-shaped portion of the posterior wall of the vagina along with the rectum without any local recurrence having taken place. In one patient about four years have now elapsed since the operation was done. The upper portion of bowel was brought down to the anus, and the patient still remains in perfect health, with complete control of the bowel and without any communication with the vagina.

The other point which is held by some to be also a very strong contraindication to operation is the situation of the cancer. It has been stated that if the cancer is so situated that the finger cannot reach the upper limit it is then inoperable. I think, however, that that dictum is, perhaps, carried a little too far, and, while admitting that a high position of the cancer is a serious matter, I do not think that it is a complete contraindication. It seems to me rather to raise the question of the method of operation than to contraindicate operative interference, for it is quite possible to remove the disease from the rectum when very high up by an abdominal operation or, if considered desirable, by a combined abdominal and perineal operation. By opening the abdomen with the patient in the Trendelenburg position, and by keeping the intestines well out of the way, the bowel can be divided above the cancer, the vessels leading to the lower portion can be easily commanded, and the lower end may be invaginated, or indeed completely removed, if it is deemed necessary, and if it is quite clear that the upper end cannot be brought down to the anus it may be brought out at a colotomy wound. The patient is thus left with a colotomy wound, just as if he had had an ordinary colotomy performed, but with the advantage over that operation that he is also possibly minus his malignant disease.

I may, in conclusion, raise three points with regard to the method of operation, namely:

1. The question of a preliminary colotomy.
2. The best method of reaching the growth.
3. The procedures to be adopted for the avoidance or diminution of sepsis, and the method in which the divided end or ends of the bowel should be dealt with.

1. *The Question of a Preliminary Colotomy.*—This is a point which has given rise to very considerable difference of opinion. Some surgeons advise that in the great majority of cases colotomy should be performed some time before the operation of excision is proceeded with. The advantages claimed are that after the subsequent excision faecal material will no longer pass over the raw surface, and the chances of severe sepsis will thus be very much diminished; and, further, that in cases where the divided ends of the bowel have been brought together they will unite much more certainly. There is no doubt that from these two points of view, especially from the latter, there is a good deal to be said in favour of preliminary colotomy. At the same time I think the disadvantages outweigh the advantages, and, in my opinion, it is only in exceptional cases that this procedure is called for. As regards the question of infection of the wound from the divided intestine, unless the end of the intestine is brought out at the skin or unless it is invaginated into the lower end of the bowel, infection of the wound will almost certainly occur quite apart from the passage of faeces over it. No doubt it may be of a worse type if faecal material is also present; but, as I shall presently point out, this can be avoided in other ways. The chief value of colotomy is in cases where end-to-end suture of the divided bowel is carried out, but by varying the method in which the bowel is united from an end-to-end suture to an invagination of the upper into the lower portion the force of this argument is very much diminished. On the other hand, the disadvantages are very

considerable. In the first place, if the case is successful it means that the patient has to go through two, or it may be three, severe operations instead of one. In the second place, although colotomy in itself is not an operation of any great danger, nevertheless, especially in cases where it is not thought advisable to open the bowel for some days after it has been brought out, the patient does go down hill very considerably, and it is a matter of two or three weeks at least before he is well enough to undergo the severe operation of excision of the rectum. But during this time the cancer in the rectum has been going on growing, and it may quite well be that when the patient is ready for the radical operation it is found that the case is no longer an operable one. Then, again, the fixation of the intestine to the abdominal wall at the upper part may in some cases seriously interfere with the pulling down of the rectum during the operation of excision, and still more seriously with the pulling down of the rectum sufficiently to allow of union between the upper and lower parts of the bowel. And, lastly, I may point out that in cases where the disease is situated high up, and where an abdominal or a combined abdominal and perineal operation is necessary, the presence of a colotomy wound is a very grave complication, and may lead to infection of the peritoneum during the operation. Hence, my own opinion is that colotomy preliminary to excision of the rectum should be regarded as an exceptional procedure rather than as one to be adopted as a general rule.

2. *As regards the Methods of Gaining Access to the Disease,* I need say very little. Four chief methods are employed—namely, the perineal, the sacral, the vaginal, and the abdominal or the combined abdominal and perineal. These four methods fall into two groups, the perineal and vaginal being only suitable for cases where the disease is quite low down in the bowel, the sacral and the abdominal or combined abdominal and perineal operations for cases where the disease is situated higher up. In the majority of cases the sacral method is the most suitable. The perineal operation does not give at all the necessary amount of room for dealing with the disease, and especially with the extension of the glands upwards, unless in cases where the disease is situated very low down; and besides, in the perineal operation one is working more or less in the dark, while in all cases of malignant disease it is an axiom that one should have plenty of room and see what one is doing.

The vaginal operation is also chiefly suitable where the disease is situated comparatively low down. At the same time I have employed it very satisfactorily in three cases where the disease was not entirely limited to the lower part, and the operation is a comparatively easy one. Of course it implies careful preliminary disinfection of the vagina. Apart from the ease with which one gets at the rectum and the peritoneal reflexion, I may point out that in cases where the bowel can be brought down to the anus additional support to keep it in its place may be obtained in stitching up the vagina by making the stitches catch hold of the muscular wall of the bowel as well.

As regards the combined abdominal and perineal operation as introduced by Quenu, this procedure is still on its trial, and so far the mortality has been very considerable. His procedure consists in ligation of the internal iliac arteries, division of the rectum, formation of a colotomy opening, and subsequent removal of the lower part of the rectum and anus from below. Personally, I prefer to remove the affected portion of the intestine above a clamp, invaginate and stitch up the lower end of the bowel and leave it in position, while the other end is brought out in the groin, and the ligature—which has been applied around the bowel before the removal of the disease—left in situ for two or three days if possible. There is really no very great advantage in dissecting out the lower part of the rectum, and it adds very considerably to the shock and loss of blood and the prolongation of the operation.

3. *The Avoidance of Sepsis and Methods of Dealing with the Divided Bowel.*—In performing these operations I consider that although the situation is one where complete asepsis is highly improbable, still all the usual precautions should be taken. The perineum should be shaved and disinfected, the rectum should have been previously washed out, and all the ordinary precautions as regards hands, instruments, etc., employed. In addition, the surgeon should avoid any examination from the rectum at the time of the operation. He should have ascertained all that he requires to know on a previous occasion; otherwise, it is very difficult to cleanse the finger afterwards; and, even if he wears an indiarubber glove, he is very apt to soil the skin, instruments, etc.

In fact, in addition to disinfecting the perineum, I always stitch up the anus tightly so as to prevent any escape of material from it during the course of the operation. Further, wherever it is possible I peel down the glands and ligature the bowel in two places, the ligatures being left long, and bring the rectum as far as possible outside the wound before the bowel is divided. This of course is not always possible, but in cases where the lower end has to be taken away the whole lower portion of the rectum can be brought out of the wound in the neighbourhood of the sacrum and dealt with outside, and thus the risk of infection of the wound is very much reduced. In addition to these procedures, I generally employ prophylactic injections of antistreptococcus serum. Although there are many other bacteria than streptococci which may enter the wound, still the chief destructive process, namely, the diffuse cellulitis which extends up in the hollow of the sacrum, and which is the chief cause of the fatal results, is essentially streptococcal in character. Since I have employed these injections I have seen very little of this severe form of cellulitis, but I must say that I have at the same time been dealing with the end of the gut in a different manner to that which I formerly employed, and it is quite possible that the chief success is due to that rather than to the serum.

As regards the method of dealing with the divided end of the bowel, the first point to be determined is whether the proximal end can be united to the distal portion or not. In a considerable number of cases, no doubt, one can unite the two ends; and I observe that Sir Charles Ball, in his recent lectures at the College of Surgeons, speaks of a large number of cases in which he has recently been able to do so; after what he has said, I feel sure that we shall try to bring down the upper end to the anus more frequently than we have done. As regards the method of uniting the ends of the bowel, I do not think that the ordinary end-to-end union, such as one employs in the intestine higher up, is a good procedure, and, as a matter of fact, if I cannot get the ends to overlap more than is necessary to have a single or double row of stitches at the point of junction, I prefer to make a sacral opening. My own experience of end-to-end union of the rectum, where there is tension on the upper portion, is that it is very apt to give way somewhere or other, and thus a severe cellulitis may result, while, if the patient recovers, the convalescence is very prolonged, and fistulae may be left which are very distressing to the patient. I believe that the best method is to draw the proximal end down into the interior of the distal end for at least $\frac{1}{2}$ in. to 1 in. Under such circumstances the mucous membrane is stripped off from the upper part of the distal end for a corresponding extent. The lower end of the proximal portion is then pulled into the tube, which is thus denuded of its mucous membrane, and secured there by stitches passing through the whole remaining thickness of the lower tube and the muscular coat of the upper. In some cases, indeed, the upper portion can be pulled right down to the anus, and the result is then practically perfect, and this should be aimed at as far as possible. In any case, by this procedure the chance of the occurrence of a fistulous opening is very much diminished, as is also that of infection of the wound.

On the other hand, where this procedure is not possible I believe a sacral opening is the proper procedure, but in doing that I do not stitch the open end of the bowel to the skin wound. Before the intestine is divided a double ligature is applied above and below the point of division, and the ligatures are left long. By means of the ligature the divided end of the bowel is kept outside or at the wound and covered by a piece of dressing, and the wound is then stitched up with silkworm gut, a drainage tube being inserted in front where the anus was. The skin around the point of exit of the rectum is then stitched to the muscular coat of the bowel as far above the divided end as possible, and the ligature is left on. In fact, if I can manage it I stitch up the wound and complete the operation before cutting off the lower end of the rectum with the tumour. In the first instance, the ligature of the bowel prevents infection of the wound from that source, and in some cases it does so for a sufficient length of time to allow the large wound to heal by first intention. No doubt gangrene at the seat of ligature commences pretty early, and then there is septic discharge in that situation, but by that time the deeper parts of the wound are often sufficiently sealed. The actual discharge of faeces does not occur in this method until the third or fourth day, when the ligature separates, and by that time the healing of the wound is usually safe. I must say that since I have adopted this plan

I have been extremely pleased with the results, and I have more than once obtained complete healing in from ten to fourteen days. As a rule, however, a certain amount of infection occurs in the immediate neighbourhood of the bowel, but it seldom extends to any depth.

The chief objection to this procedure is that by the ligature the escape of gas from the bowel is completely prevented, and some patients do suffer a good deal from flatulence. At the same time, I have not in any case found it necessary to divide the ligature in order to relieve the patient. That, however, is always a possibility. To meet this objection it may be advisable, especially in feeble patients, to remove the ligature at the time of the operation, after the bowel has been fixed to the margin of the wound and the wound stitched up, and introduce a small Paul's tube into the bowel and tie it in. Under these circumstances there is no trouble with flatulence; but in one instance, which I operated on recently, where I used a fair-sized Paul's tube, it apparently pressed too much on the lower end of the rectum, and led to sloughing and failure of union. I think this plan should be reserved for exceptional cases, and that in most instances retention of the ligature is best.

As regards the subsequent functional result, I think that in cases of sacral anus benefit is derived from Gersuny's suggestion of giving the bowel a half or three-quarter turn before bringing it out, and I always follow that plan now. In one of my cases, where about six years have now elapsed since the operation, the patient, who at first wore an apparatus, has now discarded it, and goes about even without a pad, and he has no trouble from the artificial anus. That, however, is quite an exceptional condition.

THE SURGERY OF THE SIMPLE DISEASES OF THE STOMACH.

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[AFTER thanking the members of the American Surgical Association for the invitation to present a paper at the meeting, Mr. Moynihan discussed the subject of the surgery of the simple diseases of the stomach under the following headings:

1. Perforation of gastric or duodenal ulcers.
2. Haemorrhage from gastric or duodenal ulcers.
3. Chronic ulcer; its various clinical types.
4. Hour-glass stomach.

1. PERFORATION.

The experience derived from 12 operations for perforation, of which six were successful was briefly related.

He then proceeded as follows:]

2. HAEMORRHAGE.

The bleeding from gastric or duodenal ulcers is recognizable either as haematemesis or melaena. In lesser degree these symptoms are seen not infrequently; in their severer forms they are of dire significance, and may be the sole cause of the patient's death. It is but rarely that the surgeon is called upon for so momentous a judgement as is necessary in cases of severe haematemesis or severe melaena. For the condition of the patient is poor, even, at times, desperate. Operative intervention is therefore hazardous, yet a continued bleeding will inevitably end in death.

It is necessary at the outset to emphasize the fact, a fact frequently ignored, that haemorrhage may manifest itself under entirely different circumstances in different patients. In some it is the earliest and for a time the only, symptom of gastric disturbance; in others, it is the last expression in a long and tedious course of symptoms. In other words the haemorrhage may occur from an acute or from a chronic ulcer of the stomach or duodenum. It will be found when the clinical history of a series of cases is examined that whereas in the latter the bleeding varies within the widest limits both as regards quantity and frequency, in the former the clinical history is repeated in case after case in a most remarkable manner.

Haemorrhage from an Acute Ulcer.

Under the term "acute ulcer" of the stomach are probably included several varieties of pathological conditions which are different in causation, different in destiny, but alike in the