

THE RADICAL OPERATION FOR CANCER OF THE RECTUM AND RECTOSIGMOID *

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It is my purpose in this communication to discuss briefly five problems connected with cancer of the rectum and rectosigmoid: First, operability; second, operative mortality; third, operative disability; fourth, function following operation; and fifth, permanent cure. The discussion is based on a study of 753 patients whose histories were recorded in our clinic between January 1, 1893, and December 31, 1915. Of these 430 were subjected to radical operation.

Operability.—From January 1, 1910, to December 31, 1915, 619 patients with cancer of the rectum and rectosigmoid presented themselves for examination. A radical operation was performed on 312. In 186, the disease was so far advanced that operation was not advised; in 32, operation, though advised, for various reasons was not performed; in 89, on abdominal exploration the condition was found inoperable and the operation was terminated either as an exploration or as a palliative colostomy. Eliminating the 32 cases in which operation was advised but not performed, we have 275 belonging to the group in which a radical operation was not thought possible, against 312 in which radical operation was performed, an operability of 53.1 per cent. It is interesting to note in this connection that Harrison Cripps found it advisable to perform the radical operation on only 107 of 445 patients, an operability of less than 25 per cent.

In the three years just passed—1913, 1914 and 1915—277 patients with cancer of the rectum and rectosigmoid were examined and 199 were subjected to radical operation, an operability of 71.8 per cent., the increase being due to the fact that we did not refuse radical operation because of the local extent of the disease unless it involved structures which made its eradication impossible. In 6 cases a total hysterectomy was performed coincidentally because of extension of the disease to the uterus. The posterior wall of the vagina was removed in 12 cases. In 6, a part of the posterior wall of the bladder was resected. The whole or a part of the prostate and one or both seminal vesicles were

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removed in 11. In two instances, the pelvic portion of one ureter being involved, the diseased portion was resected and the ends of the cut ureter were tied with catgut, without causing marked symptoms from the complete obstruction of the ureter. In another patient the greater part of the membranous urethra, the prostate, both seminal vesicles and the posterior half of the neck of the bladder were involved; these were removed. The patient lived nearly three years in good health before dying of metastasis. In 5 cases one or more loops of small intestine were resected because of direct extension from rectosigmoid cancer.

Ill-advised operations added very largely to the mortality, and in many instances, had it been possible to know in advance the extent of the disease, we would not have operated. It is a fact, however, that many patients with advanced disease not only recovered from the operation but remained well, and those who survived the operation and died later of recurrence received greater palliation and longer lease of life than would have followed colostomy.

Cancer of the rectum is not prone to early lymphatic involvement, tending to remain a localized process until late. In no case was lymphatic extension alone the cause of inoperability. Some patients in whom the rectal glands were involved have recovered and remained well following the radical operation, but none of our patients in whom the inguinal glands were involved made a permanent recovery, even after the most extensive glandular excision. The most frequent cause of inoperability was local extension of the disease to neighboring organs; the next in frequency was metastasis of the liver; and the third, peritoneal and retroperitoneal metastases.

Theoretically at least, the abdominal cavity should be explored in every case of carcinoma of the rectum because of the frequency with which metastases in the liver or peritoneal cavity are to be found, and unless such an exploration be made before a radical operation is undertaken, a number of patients will be subjected to a serious and mutilating operation without the possibility of cure.

Cancers which involve the upper rectum cannot be separated surgically from cancers of the terminal sigmoid. There seems to be a marked tendency for high cancer of the rectum to invade the sigmoid and those in the sigmoid to extend into the rectum proper. Hence it may be impossible to determine whether a given growth was primary in the terminal sigmoid or in the upper rectum. It seemed wise, therefore, to classify high rectal and terminal sigmoid cancers in one group as rectosigmoid cancers. In this group the question of operability is most difficult to decide.

Operative Mortality.—The mortality of the operation itself depends, to a large extent, on what cases are accepted for radical operation and how radical an operation is performed. For example, we performed 30 radical operations by the Harrison Cripps method without a death, but the number of cases in which this operation may be applied is limited if the patients' best interests are considered. Cases which, in our early experience, we would not have considered operable, we now subject to operation for reasons already given. Again, an operation considered sufficient in the first period was not considered sufficiently radical at the later period. Of the 753 cases, a radical operation was performed in 430, with an operative mortality of 15.5 per cent. During the period from 1893 to 1910 the operative mortality was 17.8 per cent.; from 1910 to 1913 it was 17.7 per cent. with an operability of 51 per cent.

For the years 1913, 1914, and 1915, the mortality averaged 12.5 per cent., and the operability 71.8 per cent., while the operations were made more radical. Increased experience has now brought this mortality to about 10 per cent., and a wiser selection of cases for operation will still further reduce the death-rate.

Comparison of the mortality in cancer of the rectum of various clinics shows that low mortality is coincident with low operability. An operability of 25 per cent. in our clinic would have reduced the mortality to a point under 5 per cent., since it would have eliminated cases with advanced disease which give the high mortality. It is a question of an advancing frontier in which large operability gives an apparently high mortality and a low percentage of cures, with the paradox that when the total number of cases is taken into consideration it will be found that a larger number of patients have been cured. In other words, operative mortality means nothing unless the total number of cases examined is taken into consideration.

All patients dying in the hospital after the radical operation were classified, without regard to the length of time that elapsed before death occurred, as having died from operation. Many of these patients died after some weeks from nephritis, cardiovascular disease, etc., which they had at the time of the operation. However, there seems to be no way of properly estimating mortality without including them, and a certain amount of statistical hardship must be accepted in order that we may have a common basis for computation. Consent is obtained for necropsies on about 95 per cent. of the patients who die in the Clinic. In cases operated on, we make it a rule that the operating surgeon or one of the surgical assistants shall attend the necropsy in order that his exact

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technical knowledge of the operative procedure may aid the pathologist in arriving at the primary and contributory causes of death.

Among the facts which were especially apt to increase the mortality was obesity, the fat patient, especially the male, giving almost a prohibitive mortality from the one-stage combined abdomino-posterior operation. However, obese patients withstood well the two-stage operation and also operations of the perineal or posterior Kraske type, though in the case of very obese individuals the colostomy itself was sometimes made with difficulty and was attended by a very considerable risk. In such patients we have not infrequently made the posterior radical operation in a single stage, without exploration or colostomy, completing the operation with a posterior anus at or near the normal situation.

The important causes of operative mortality are:

1. Sepsis, 39.8 per cent. The sepsis was due usually to soiling the wound or peritoneal cavity during the operation with intestinal contents. This occurred most frequently in cases in which the growths had caused obstruction; consequently, radical operations are seldom permissible until the obstruction has been relieved. In cases of this kind the two-stage operation proved of the greatest value. The colostomy relieved the obstruction and made possible thorough cleansing of the lower fragment, which, by reducing the infection, tended to produce more favorable conditions for operation later. The disadvantage of this method lay in the fact that the blind stump created between the colostomy and the point where the lower sigmoid was turned in behind had a tendency to develop late infections, fistulas, etc., in the posterior wound. It would appear that the percentage of deaths from sepsis was too high and undoubtedly this is true. Few of the patients in whom the growth was movable died from sepsis following operation, but we found it exceedingly difficult to prevent soiling of the wound in those cases in which the rectum was fixed and the growth had completely penetrated through the walls of the rectum, especially when this fixation took place in a situation where the peritoneal cavity was involved. This was particularly true of the rectosigmoid cases in which the operation was necessarily performed from above—cases often complicated with abscesses in the pelvis and adhesions to the small intestines. In this group the mortality was more than 30 per cent. One might well ask: Is it justifiable to attempt the radical operation under these circumstances? The answer depends upon the point of view. Colostomy in such cases is a most meager palliation and the fact remains that in

nearly 20 per cent. of such extremely advanced cases in which the radical operation was performed, a five-year cure was obtained.

2. Nephritis, 13 per cent. ; usually an acute nephritis superimposed on a chronic process. Infections, hemorrhage and interference with the function of the bladder played a considerable part in its production. The post-operative subcutaneous introduction of fluids into the general circulation is most important in preventing this complication.

3. Undiscovered metastatic tumors, 10.5 per cent. Unfortunately, abdominal exploration does not always reveal such growths, especially when they are buried in the substance of the liver, by all odds the most common condition. Small areas of cancerous involvement in the peritoneum and posterior fatty tissue are also sometimes overlooked. Patients with metastatic cancer have little vitality and often die from exhaustion following an operation which would not have been performed had the true condition been known. By more thorough exploration some of these operations and deaths have been avoided, though not all.

4. Hemorrhage, 6.5 per cent. While no patient died from hemorrhage directly, two died from so-called secondary shock, due to loss of blood from poorly controlled hemorrhage. In the remaining cases in this group hemorrhage was the chief factor leading to infection and exhaustion. We have not found that extensive operations of themselves have added very greatly to the mortality unless accompanied by increased loss of blood. In other words, unless there has been hemorrhage, I have not seen shock, the patients being in excellent condition at the completion of the most formidable procedures.

Prolonged operations with great traumatism may cause shock without actual loss of blood, but the condition is the same, the blood being withdrawn from the general circulation and lying in the suddenly dilated venous trunks of the abdomen.

5. Obstruction of bowels following operation, 3 per cent. In closing the gap in the pelvic peritoneum to prevent the small intestines entering the space from which the growth has been removed, a continuous chromic catgut suture should be used. I lost two patients some time after operation from chronic obstruction of the bowels, because I had used interrupted chromic catgut sutures, and following the operation, part of the lateral wall of the small intestine had pushed through a little crevice in the suture line.

In one case death was due to the inclusion of both ureters in suturing the peritoneum to close the pelvic cavity. The ureters had been in full

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view but too much of the peritoneum and lateral structures of the pelvis were taken up in the suture in the attempt to secure a firm closure.

The remaining deaths were due to exhaustion and occurred usually some days or weeks after operation.

Operative Disability.—Asepsis leads to primary wound healing. We have had patients leave the hospital with completely healed wounds in sixteen days and return to their employment in thirty days. Infected wounds were often six to twelve weeks in healing, and three or four months occasionally elapsed before the patients returned to work.

Function Following Operation.—The best function that we have been able to obtain following operation has been after the tube method of resection described by Balfour and the C. H. Mayo method of direct end-to-end union between the end of the sigmoid and the anal canal. The Weir method of invaginating the growth through the anus—amputation and direct through-and-through suture from the mucous surface—has given excellent results, but the method of invagination can be practised in only a small number of cases. The attempt to save function, however, has been one of the most common causes of technical failures resulting in sepsis and death or failure to obtain permanent cure. In order to save function, modifications were made in the operative technic resulting in a less thorough eradication of the disease. Patients, as a rule, were willing to accept a definite increase in possible mortality and a reduction of prospects of permanent cure that the function so highly desirable might be obtained.

The manner of performing colostomy does not seem to have made much difference in the ultimate functional results, but, in any event, the opening should be made well above the pudendal hair, which, when soiled, tends to uncleanness and fecal odor. We have had good results with the Littlewood method, which places the colostomy in the waist line above the left anterior superior spine of the ilium. This obliterates the peritoneal space to the left of the colostomy and prevents the small intestine's becoming incarcerated and adherent in this situation. In two cases in our experience colostomy in the left rectus muscle was followed by obstruction of the bowels from this cause.

Mixter advises making the colostomy in the midline just beneath the umbilicus, and we have used this situation in a number of instances with satisfaction. The Mixter colostomy furnishes direct access to the lower sigmoid and rectum and facilitates cleansing, when made as the first stage of a two-stage operation. It also appears to be less liable to late infections in the blind end following the radical operation. Moreover, it rapidly terminates a midline exploration or radical opera-

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tion by placing the colostomy in the upper end of the working incision, and the results are so satisfactory that we are employing it extensively.

Care in regard to diet, the development of a 48-hour habit of bowel movement and the use of a large amount of water as an enema to empty the large bowel thoroughly once in 24 to 48 hours, does much to render the management of a colostomy successful. The radical operation of Harrison Cripps, while applicable only to cancer of the low rectum and anal canal, gives marvelously good functional results. In those cases in which extensive dissections about the bladder, prostate, urethra, etc., have been made, the return of control of the bladder is sometimes slow. One of our patients lost control of the bladder to a large extent permanently, and catheter life is necessary. This patient is impotent.

Permanent Cures.—Of the 430 patients on whom a resection was done, 364 recovered from the operation. Eliminating those who were operated on less than three years ago, we have 33.3 per cent. who lived three years or more, and 28.3 per cent. who lived five years or more, after the operation. These percentages may be increased fairly to 37.5 and 35.8 per cents., respectively, by subtracting from our mortality figures the normal death-rates for corresponding ages for periods of three and five years, *i.e.*, 4.2 and 7.5 per cents.¹

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¹ Medico-Actuarial Mortality Investigation Table.