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CARCINOMA OF THE RECTUM SOME POINTS ON PATHOLOGY AND TREATMENT*

BY

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(With Special Plate)

My observations are based on a study of my patients during the past ten or more years. The majority of these cases have been patients in either the general or private wards of St. Mark's Hospital, where we have a well-organized "follow-up system," and so the patients are kept under constant supervision. Almost all the specimens, whether removed in hospital or elsewhere, have been examined by Dr. Cuthbert Dukes, pathologist to St. Mark's Hospital, and classified according to the now generally accepted scheme of *A*, *B*, and *C* cases.

Classification of Growths

An *A* case is one in which the growth is still confined to the bowel wall and has not spread to the extrarectal tissues. (See Figs 1, 2, 3, 8, and 9.)

A *B* case is one in which extrarectal spread has taken place, but the regional lymphatic nodes are not involved. (See Figs. 4, 5, 10, 11, 12, 13, and 17.)

A *C* case is one in which the regional nodes are invaded by growth. (See Figs. 6, 7A, 7B, 14, 15, and 16.)

A further subdivision into *C* 1 and *C* 2 cases has been suggested: a *C* 1 case implying malignant invasion of the lymph nodes below the point of ligation of the inferior mesenteric vessels, and a *C* 2 case one in which the lymph nodes at the site of ligation, and even above this level, are involved.

Another classification of malignant tumours is that of Broder, and is based on cell differentiation. Four grades are distinguished: Grade 1, in which from 100 to 75 per cent. of differentiated malignant cells are present; Grade 2, 75 to 50 per cent.; and Grades 3 and 4, in which the cells show irregularity of structure and a large proportion of undifferentiated cells are present.

It is of interest to note that in a series of cases examined by Dukes at St. Mark's Hospital most of Grade 1 were *A* cases, whereas Grades 3 and 4 were for the most part *C* cases, but the majority of the tumours in all grades belonged to Grade 2.

Lines of Spread of Carcinoma

At St. Mark's Hospital the specimens removed by operation are systematically examined. The growth is freely sectioned, and all the lymph nodes are dissected out and examined microscopically. The superior haemorrhoidal vein is also carefully examined. Cancer of the rectum spreads by three distinct paths: (1) by direct extension into the surrounding tissues, both on the surface and deep

to it; (2) by the lymphatics; and (3) by the veins. In the early stages the disease is a local one, and a modified and local excision, such as by the perineal route, is sufficient to eradicate the disease.

One can often diagnose an early case (that is, an *A* case or one in which the disease is still confined to the bowel wall) by digital examination of the rectum. Such growths are polypoid and protuberant, with little if any ulceration in the centre, and are mobile. As the growth infiltrates the wall superficial necrosis and ulceration takes place. A deeply ulcerated and fixed growth is either a *B* or a *C* case.

Lymphatic Spread

Dukes has shown that infiltration of the bowel wall by lymphatic spread is a slow process, taking many weeks. In a large series of *A* cases (growths confined to the bowel wall) it has been shown that there was not a single example of lymphatic metastasis. This is a most important observation clinically as well as pathologically, since the presence of enlarged glands in the mesocolon found on abdominal exploration does not of necessity imply that they are infected with malignant disease. The enlargement is often of a chronic inflammatory nature.

Harrison Cripps held the view that rectal carcinoma was a local disease at the onset, the growth eventually perforating the bowel wall and invading the perirectal tissues, lymphatic and glandular infection being late manifestations. Hence early diagnosis and early excision lead to a very favourable prognosis. In such cases the operation need not be a very extensive one.

I remember quite well that in cases of early carcinoma of the rectum the late Mr. Clutton, whose house-surgeon I was at St. Thomas's Hospital, laid stress on the importance of resecting the growth with 1/4-inch free margin all round. This he used to do by pararectal incision, removal of the coccyx, freeing the rectum, and local excision of the tumour, with subsequent closure of the bowel wall. I can assure you that Mr. Clutton achieved some excellent results.

The lymphatic spread in cancer of the rectum has recently been thoroughly worked out at St. Mark's Hospital, and the results of this investigation have been embodied in a most valuable article written by Gabriel, Dukes, and Bussey.¹ The following are some of the conclusions which have been arrived at as a result of this investigation.

"1. That in cases of cancer of the rectum treated by radical excision the prognosis depends to a large extent on whether or not the lymphatic glands contain metastases.

* Presidential address delivered before the Harveian Society, 1935.

Quoting from the follow-up records at St. Mark's Hospital, it has been shown that in the *A* group of cases removed by perineal excision 91 per cent. of the operation survivors are alive after five years; in the *B* cases with extrarectal spread but no glandular metastases 64 per cent. In the *C* cases with glandular metastases only 16 per cent. of cases of perineal excision survived the five-year limit. It is therefore obvious from this series of cases that the perineal excision has been very satisfactory in the *A* group of cases, fairly satisfactory in the *B* group, but unsatisfactory in the *C* group.

"The course of lymphatic dissemination was found to be as follows. The first glands to be affected were those in the immediate vicinity of the growth, after which a continuous spread takes place along the glands accompanying the superior haemorrhoidal vessels. It is the exception for the higher glands to be affected, unless the regional glands in the immediate vicinity of the growth are also involved. A few isolated cases, however, have been recorded.

"Lymphatic spread is rarely, if ever, in a downward direction. Unless the lymphatic channels are all blocked no downward or lateral lymphatic spread is found, but when carcinomatous metastases are present in all the haemorrhoidal glands then there may be extension in other directions. Miles has stated that the paracolic glands situated along the mesenteric border of the pelvic colon are often the seat of metastatic deposits. Only one example of this was found in the 100 cases of glandular dissection, and this was a very advanced case, in which all the lymphatic nodes and vessels were infiltrated with growth.

"In the 100 gland dissections lymphatic metastases were found in sixty-two cases; the majority of these, however, were *C 1* cases, and only a few *C 2* cases, in which the disease had spread by lymphatic channels to the limit of surgical removal."

It is interesting to note from a study of the investigations already referred to that in the majority of the *C 1* group of cases the regional lymphatic nodes in the immediate neighbourhood of the growth were the only glands involved. It would seem probable, therefore, that with carcinoma involving the lower part of the rectum an extensive perineal excision might be quite effective in extirpating the disease in a number of *C 1* cases. (See Figs. 6, 7A, and 7B.)

This has been borne out as shown by a consideration of my own cases, in which there are several *C 1* cases alive and well ten years, seven years, and five years respectively after a perineal excision. In this connexion I think it should be borne in mind that the operative mortality from perineal excision is almost *nil*, whereas it is still quite appreciable in cases of abdomino-perineal or perineo-abdominal excision. Until recent years it has been my practice to remove the rectum by perineal excision wherever possible, and I still believe that this is the correct line of treatment with growths low down in the rectum. Of course the perineal method of approach is quite unsuitable for growths involving the upper part of the rectum, or recto-sigmoidal region, when an operation of greater magnitude is necessary. (See Figs. 8, 9, 11, 12, 13, and 14.)

Venous Spread

Venous spread in cases of carcinoma of the rectum has only been systematically investigated during the past year at St. Mark's Hospital.

It usually occurs in the *C* group of cases. It may, however, arise in any group of cases, and would furnish a feasible explanation for death occurring at a later date from metastatic deposits in the liver. If discovered on examination of the specimen removed the prognosis is obviously very grave. (See Fig. 11.)

Pathological Details

The association of adenomata with rectal carcinomata has been proved as the result of observations carried out by Dukes. Examination of such adenomata at a distance

from the original growth has, in certain cases, shown evidence of early carcinomatous changes. (See Figs. 15 and 17. The latter is alive and well twelve years after operation.) The occurrence of multiple malignant growths in the rectum and colon may be explained by simultaneous carcinomatous changes in established adenomata. So-called "recurrences" after excision of the rectum for carcinoma are, without doubt, in many cases the result of other unsuspected adenomata taking on malignant properties, and so are not recurrences in the true sense of the word.

As I have previously pointed out in a presidential address on multiple malignant growths, given at the Royal Society of Medicine,² several primary malignant tumours may exist at the same time, especially in the rectum and colon. We have many examples of this in our museum at St. Mark's Hospital, and I am showing a specimen which I removed recently in which two malignant growths are present in the rectum.

It is important to remember the possibility of multiple lesions when exploring the abdomen as a preliminary to an excision of the rectum; a few minutes spent in palpating the colon may occasionally alter one's plan of procedure. To illustrate this point I would mention the case of a man aged 70, who came under my care for acute intestinal obstruction. Digital examination of the rectum revealed the presence of a large growth, completely blocking the bowel. On making an incision to perform a left iliac colostomy the portion of pelvic colon which presented showed the presence of another growth. Further abdominal exploration revealed a third large growth in the transverse colon, which was the main obstructing agent. The colostomy had to be made in the transverse colon proximal to this growth. I can also record a similar condition in an elderly lady, where a growth in the rectum and pelvic colon coexisted, necessitating a transverse colostomy instead of a left iliac colostomy as planned before abdominal exploration.

To illustrate this point further, I remember removing a growth of the lower pelvic colon by Hartman's operation—namely, resection of the tumour by the abdominal route, closure of the lower end, and bringing the upper end out as a terminal colostomy. A short time afterwards, on straining, a polypus prolapsed through the colostomy. This was ligatured and removed *in situ*. Microscopical examination proved that this was also a malignant growth. Carcinoma of the rectum undoubtedly starts in a preformed adenoma or papilloma. The practical lesson to be learned is that all adenomata or papillomata found during routine examination of the rectum or pelvic colon—for example, by proctoscopy or sigmoidoscopy—should be removed.

I am showing a specimen of a polyp removed from the pelvic colon. This polyp had a long stalk, and could be seen quite easily with the sigmoidoscope. It was removed by an abdominal operation and incision of the colon. Microscopically the stalk and most of the tumour were benign in character, but several areas of malignant transformation were present in the free end of the tumour. (See Fig. 18.) This adenomatous condition already referred to must not be confused with polyposis *intestini*, which is a familial condition following the Mendelian law and in which sooner or later malignant changes occur.

From the foregoing observations one may, I think, justifiably draw the following conclusions.

1. In carcinoma of the rectum the prognosis largely depends on whether the case belongs to the *A*, *B*, or *C* group.

2. The prognosis is very grave if microscopical examination of the specimen removed shows evidence of malignant invasion of the superior haemorrhoidal or inferior mesenteric veins.

3. The immediate mortality is much greater after an excision of the abdomino-perineal or perineo-abdominal type than after a perineal excision.

4. Adenomata or polypi must be regarded as a potential source of danger, and should be removed whenever discovered on routine examination with such instruments as the proctoscope or sigmoidoscope.

5. Death from so-called recurrence some years after excision of the rectum for malignant disease is in certain cases not strictly the result of recurrence of the original tumour removed, but may be due to subsequent malignant changes occurring in adenomata in other portions of the colon.

Diagnosis

The disease is often most insidious in onset, and the history may be most misleading. This is especially the case with growths in the recto-sigmoidal region, where gradually increasing constipation results, but no serious notice is often taken of this by the patient until obstruction becomes marked. The passage of blood and slime in such cases is often considered by the patient to be due to piles, and no advice is sought until the disease is advanced. On the other hand, growths in the lower part of the rectum usually give rise to frequent and ineffectual calls to stool, with passage of blood and mucus. In such cases advice is sought at an earlier date. This is especially so when the growth encroaches on the anal canal, when pain is felt.

I need hardly point out the importance of digital examination of the rectum as part of the routine investigation of a patient, whether rectal symptoms are mentioned or not. One can be so easily "caught out" if such an examination is neglected. To quote one example, I remember being asked to see a patient with an abdominal tumour, supposed to be a carcinoma of the transverse colon. On digital examination of the rectum an extensive growth was evident; the abdominal tumour was a collection of faeces.

Many cases of carcinoma of the rectum are missed as the result of neglecting to pass a finger. No physician would neglect to listen to the chest of a patient with the stethoscope, whatever the complaint; similarly, no examination of a patient is complete without an examination of the rectum. In the majority of cases a growth in the rectum or recto-sigmoidal region can be felt by means of the examining finger. In certain cases, however, doubt may arise as to the diagnosis, when sigmoidoscopy is essential. It is our custom at St. Mark's Hospital to remove a portion for microscopy of any tumour seen with the sigmoidoscope. This is done by means of Brunings's forceps, when in most cases a definite diagnosis can be established within twenty-four or thirty-six hours.

I would here stress the fallacy which may occur if a barium enema with x-ray examination is relied upon for the diagnosis of carcinoma of the recto-sigmoidal region or pelvic colon. The growth may be too high to be felt with the finger, and a barium enema may give a negative result, since the recto-sigmoidal region and lower portion of pelvic colon may be masked by the shadow of the barium-filled rectum. Sigmoidoscopy in such a case is essential. I had a case of this nature recently, where sigmoidoscopy revealed the presence of a growth in the lower pelvic colon after digital examination and barium enema had yielded a negative result.

Again, during the routine examination of a patient complaining of piles an unsuspected carcinoma may be discovered. Every patient with piles admitted for operation to St. Mark's Hospital is examined with the sigmoidoscope, either in the out-patients' department or after admission to hospital, in order to exclude the presence of malignant disease. In a certain percentage of cases systematically examined in this way a carcinoma is revealed higher up the bowel.

Operative Technique

I do not propose to go into details with regard to the various methods employed for removal of the rectum for carcinoma. The perineal operation is usually performed in two stages—namely, abdominal exploration and colostomy, followed after a fortnight or three weeks by an excision by the perineal route. Very little shock results, and the operation mortality is almost *nil*. The abdomino-perineal and perineo-abdominal operations may be performed in one or two stages, depending on the presence or otherwise of any degree of obstruction.

At St. Mark's Hospital we rather favour the perineo-abdominal route, for the following reasons:

1. If after setting out to perform a perineal resection it is found that the disease extends higher in the bowel one can continue the operation as a perineo-abdominal excision.

2. It is much easier to close the pelvic peritoneum when the pelvis has been emptied of the rectum and pelvic colon than it is when these have been doubled down into the pelvic cavity, as in an excision by the abdomino-perineal route. Incidentally, it is a great advantage in stout patients to have an empty pelvic cavity before refashioning the floor of the pelvis.

3. In either case a blood transfusion given soon after the operation is essential; it has been the means of considerably lowering the operation mortality.

In the radical cure of carcinoma of the rectum a permanent colostomy is usually essential, although some successful results have been recorded in which the normal passage has been restored. Conservative resection of the rectum for carcinoma, with or without a preliminary and temporary colostomy, is in my opinion only justifiable in very early cases in which the patient absolutely refuses to be left with a permanent colostomy.

Radium Therapy

Radium has a place in the treatment of inoperable carcinoma of the rectum proper. (I am not referring to epithelioma of the anus, which responds extremely well to radium treatment.) In such cases a preliminary colostomy is advisable, since one has a much cleaner field to start with for interstitial irradiation, and usually the cure is associated with much fibrosis and stenosis of the lumen.

I would mention two cases of inoperable carcinoma of the rectum in women treated by interstitial irradiation; in one the growth was beginning to ulcerate through the posterior vaginal fornix. Both of these patients are in good health five and a half years after treatment, but in both the rectum is almost completely stenosed.

My best thanks are due to Dr. Cuthbert Dukes, pathologist to St. Mark's Hospital, for the preparation and examination of the specimens removed; also to Mr. H. J. R. Bussey, research assistant at St. Mark's Hospital.

REFERENCES

- ¹ Gabriel, Dukes, and Bussey: *Brit. Journ. Surg.*, 1935, xxiii, No. 90.
- ² Norbury: *Proc. Roy. Soc. Med.*, 1930, xxiv.

The annual general meeting of the Union Thérapeutique will be held on October 14th, at the Faculty of Medicine, Paris, under the presidency of Professor Loeper. In the morning there will be considered the organization of the control of drugs; the insulin and dietetic treatment of diabetes; the basis of ascorbic acid therapy; methods of restoration to life; pyrotherapy in the medical complications of gonorrhoea; and the surgical treatment of asystole by total thyroidectomy. In the afternoon there will be a general meeting to discuss the treatment of migraine from the points of view of the therapeutics of vascular spasms, hepatic medication, and methods of employing alternatives. The annual subscription for membership of the Union Thérapeutique is 20 francs. Inquiries should be addressed to the general secretary, Dr. G. Leven, Rue de Téhéran, Paris, 8ème.

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FIG. 1.—Mrs. H., aged 56. "A" case. Perineal excision.

FIG. 2.—Mr. W. "A" case. Perineal excision.

FIG. 3.—Mr. R., aged 49. "A" case. Perineal excision.

FIG. 4.—Mr. I., aged 63. "B" case. Perineal excision.

FIG. 5.—Mr. P., aged 78. "B" case. Perineal excision.

FIG. 6.—Mrs. K., aged 54. "C" case. Perineal excision.

FIGS. 7A and 7B.—Mrs. S., aged 61. "C 1" case. Perineal excision. Arrows point to glandular metastases.

FIG. 8.—Mr. R., aged 69. "A" case. Abdomino-perineal excision (one stage). Length of bowel removed 18 in.

FIG. 9.—Mrs. S., aged 62. "A" case. Abdomino-perineal excision (two stages). Length of bowel removed 17 in.

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FIG. 10.—Mr. Z., aged 58. "B" case. Perineo-abdominal excision (one stage). Length of bowel removed 21 inches.

FIG. 11.—Mr. R., aged 54. "B" case. Infiltration of superior haemorrhoidal vein with carcinoma. Perineo-abdominal excision. Length of bowel removed 18 inches.

FIG. 12.—Mr. O., aged 60. "B" case. Perineo-abdominal excision (one stage). Length of bowel removed 22 inches.

FIG. 13.—Mr. S., aged 56. "B" case. Perineo-abdominal excision (two stages). Length of bowel removed 17 inches.

FIG. 14.—Miss L., aged 40. "C 1" case. Perineo-abdominal excision (one stage). Length of bowel removed 16 inches.

FIG. 15.—Mr. D., "C 1" case. Two malignant growths and a simple adenoma. Perineo-abdominal excision (one stage).

FIG. 16.—"C 2" case. Perineo-abdominal excision (one stage). Length of bowel removed 21 inches.

FIG. 17.—"B" case. Perineal excision. Note multiple adenomata.

FIG. 18.—Cancer developing in a pedunculated polyp.