

FACTORS INFLUENCING THE LIFE EXPECTANCY OF PATIENTS OPERATED ON FOR GASTRIC ULCER*

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THREE years ago I presented before this Association a paper in which it was shown that the subsequent death † rate in patients operated on for duodenal ulcer was not greater than that of the general population of similar age and sex, but that it was three times as great in patients operated on for gastric ulcer. It is well known that gastric ulcer is a more serious disease in every respect than duodenal ulcer: because of the disability from the symptoms it produces, the danger from these symptoms, the less response to medical régime, and the greater risk and the less satisfactory results of surgical treatment. The fact that the subsequent death rate in patients successfully operated on for gastric ulcer proved to be three times the death rate of a similar group of the general population, prompted me to make further investigation, the results of which I desire to place before the Association.

During a period of fifteen years, prior to January, 1921, 1280 patients with gastric ulcer were operated on in the Mayo Clinic. In this series, 195 deaths occurred following satisfactory recovery from the operation. I have endeavored by every possible means to ascertain the causes of these deaths. The information obtained by a review of case histories, by correspondence, by reëxamination, or by further operation shows very clearly that the most important single factor influencing the life expectancy of patients operated on for gastric ulcer is gastric cancer. The exact number of deaths due to gastric cancer cannot be ascertained, but it easily constitutes the most common cause of death. There is, moreover, little doubt that many of the deaths for which no cause was given were due to cancer. Exclusive of these, there were seventy-five deaths from gastric cancer, which comprise about 40 per cent. of the total number of deaths, and the remainder in which the cause is known are, with few exceptions, due to causes independent of the stomach. Gastric cancer, then, may well be regarded as the factor most worthy of consideration, necessitating a review of the pre-operative history of the patient, the character of the gross lesion found at operation, the microscopic picture of the lesion, and the operative method used in dealing with the lesion.

Patients who subsequently died of gastric cancer may be divided into two groups, those in whom the lesion was not removed, and those in whom the lesion was removed. In the first group there is a striking similarity in the description of the lesions found at operation, all conform more or less to the following operative record: "Large ulcer of posterior wall, adherent to

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† Subsequent death in this paper refers to the deaths occurring after the dismissal of the patient from the hospital.

pancreas, involving too much of the stomach and too firmly adherent to warrant the risk of removal. Ulcer may be malignant but unable to get specimen for examination. Glands inflammatory. Posterior gastro-enterostomy." Such cases have been classified in the Clinic as ulcer, but the fact that forty patients succumbed to gastric cancer within two years of operation shows with little doubt that the condition was cancer at the time of operation and should have been classified as gastric cancer or cancer on ulcer, depending on the duration and character of the symptoms previous to operation. As a contribution to the ever-interesting subject of the liability of ulcer to cancer degeneration, I would point out that the patients who died of cancer following gastro-enterostomy or other indirect operations for supposed ulcer presented a history of gastric ulcer for an average of five and eight-tenths years before operation. These cases, at least, should be removed from the benign gastric ulcer group, and this deduction alone makes a very material difference in the life expectancy statistics which have been reported.

A few cases suggest, because of the long time between operation and death from cancer, that malignancy may have developed in the ulcer after the gastro-enterostomy. The rate of growth of gastric cancer is so variable, however, that it would be unwise to hold a positive opinion concerning such cases. There are, however, two clear indications for dealing radically with these large ulcers; namely, the ulcer may be already malignant, or it may take on malignant changes if it is not removed.

Since it is often impossible to determine from the history or any pre-operative tests, or even from operation whether these large ulcers are malignant, and since it is only in the subsequent course of these cases that the real character of an unremoved lesion becomes apparent, radical removal is essential. Radical removal of these large ulcers means, however, a considerably increased operative risk but such treatment would be justified because the subsequent death rate following gastro-enterostomy alone in such cases is at least 25 per cent. Inasmuch as the ulcers are often too large for the safe operation of local excision and gastro-enterostomy, partial gastrectomy must be employed in order to deal adequately with the lesion. When the ulcers are near the pyloric end of the stomach, pylorotomy may be performed restoring gastro-intestinal continuity by Billroth No. 2 or by Polya's method, depending on the ease of approximation of the jejunum and the stomach. Unfortunately, the desirable practice of widely resecting large ulcers cannot be applied in all cases, because of their fixation, size, and situation, or the condition of the patient. Patients in whom the lesion is irremovable and in whom time only will reveal the nature of the lesion, should be placed in a deferred classification.

Summing up the management in this group of large ulcers it may be said that, while gastro-enterostomy alone gives fairly good results for the ulcer which has not undergone malignant change, the impossibility of determining

LIFE EXPECTANCY FOR GASTRIC ULCER

the question of malignant invasion at the operating table makes wide excision of such ulcers of first importance.

In the group of cases in which the ulcer was removed, there were 130 partial gastrectomies with four (3 per cent.) subsequent deaths from cancer, 296 cautery excisions and gastro-enterostomies with ten (3.3 per cent.) subsequent deaths from cancer, 172 knife excisions and gastro-enterostomies with eleven (6 per cent.) subsequent deaths from cancer and fifty-six sleeve resections with no subsequent deaths from cancer. The low mortality rate from partial gastrectomy is marred by the fact that the subsequent death rate from all causes following this operation is 18 per cent., as compared with 7.5 per cent. for knife or cautery excision with gastro-enterostomy, and 5.12 per cent. for segmental resection.

Broders has kindly examined the available specimens from patients who subsequently died from cancer which were classified as ulcer by the pathologist at the time of operation. He finds, after studying a large number of areas from each specimen, that there is evidence of malignant change in about 50 per cent. This not only illustrates the difficulty of detecting early invasion of an ulcer by cancer, but emphasizes again the necessity of most painstaking search of every gastric ulcer for evidences of cancer degeneration. The difficulties of explaining these deaths from cancer are made greater by the fact that we do not know the incidence of cancer in the stomach from which a benign ulcer has been removed.

The lesson to be learned from the group of cases in which the lesion was small enough to be subjected to excision by knife or cautery and followed by gastro-enterostomy is not clear. Since the death rate from cancer is 3 per cent. after cautery excision, 3.3 per cent. after partial gastrectomy, 6 per cent. after knife excision, and 0 per cent. after sleeve resection, the evidence certainly is in favor of the last operation. In the Mayo Clinic, however, the segmental resections have usually been made in cases in which ulcers are favorably situated and have more or less hourglass contraction, so that the applicability of the operation is limited and the results, therefore, good. Local excision followed by gastro-enterostomy for all other small ulcers seems now to be well established. With regard to the method of excision, the cautery has many advantages and I would like to direct attention to the method of employing the cautery which Sistrunk has introduced in the Clinic. Instead of burning out the ulcer, as I originally suggested, he excises the entire ulcer with the cautery knife; this secures the ulcer for microscopic examination, and the heat may be effectively employed in thoroughly searing the edges of the incision. Although the risk accompanying this method may be slightly greater than in the usual procedure, I believe it is the best technic to use when the ulcer area can be satisfactorily mobilized.

Gastric cancer, then, is the chief factor to be reckoned with in estimating the life expectancy of patients operated on for gastric ulcer. The evidence, however, indicates that in almost all of these deaths from cancer the lesion

DONALD C. BALFOUR

had already undergone malignant changes at the time of operation. For this reason sixty cases should be omitted from this series in reckoning the life expectancy of patients operated on for benign gastric ulcer. On this basis, their life expectancy is considerably better than hitherto reported and the subsequent death rate, instead of being three times the death rate of the general population of similar age and sex, is less than twice the rate.

OPERATIONS FOR GASTRIC ULCER

	Cases	Subsequent deaths
Partial gastrectomy.....	130	4 (3 per cent.)
Cautery excision and gastro-enterostomy.....	296	10 (3.3 per cent.)
Knife excision and gastro-enterostomy.....	172	11 (6 per cent.)
Sleeve resection.....	56	

BIBLIOGRAPHY

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