FACTORS OF SIGNIFICANCE IN THE PROGNOSIS OF CANCER OF THE STOMACH

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ANY discussion of cancer of the stomach should include some reference to the problem of early diagnosis. Cancer of the stomach in its early stages is so situated that in probably 90 per cent of cases the lesion could be satisfactorily removed, yet the present operability in the disease is only between 20 and 25 per cent. Of no other form of cancer is this paradox as true. The chief reason for this is the absence of definite symptoms in the early stages of the disease, and the hope of any advances in detecting the disease in this operable stage rests on the alertness of the layman and the physician to the facts that cancer of the stomach is by far the most common organic disease of the stomach and that there are methods of determining whether or not the disease is present. The skilled roentgenologist, in 95 per cent of cases, can visualize organic lesions of the stomach, although concerning approximately 20 per cent of these a definite opinion as to the nature of the lesion is not warranted. This inability to distinguish between some of the lesions is also the experience of the surgeon, and it is frequently true that not until microscopic examination is possible is the true nature of the lesion revealed. To what extent the gastroscope, in skilled hands, can improve this situation remains to be seen, but it seems reasonable to believe that any method which satisfactorily will allow visualization of the entire mucosal area of the stomach, holds great possibilities for development.

The curability of cancer of the stomach by surgical removal of the growth has been well established. When the growth and the regional lymph nodes can be thoroughly extirpated, five year cures* occur in about 30 per cent of cases; this is based on 18 per cent of five year cures when lymph nodes are involved and 48 per cent of five year cures when lymph nodes are not involved. Such facts, in contrast to the absolute hopelessness of the disease with any other method of treatment, constantly should emphasize the importance of developing every means for recognition of the disease while the growth still can be removed.

Accuracy in prognosis in disease is properly interpreted by the layman as an evidence of professional experience and knowledge. In cancer of the stomach, this is particularly true and whether or not the diseased tissue has been removed, relatives and friends can much more easily adjust themselves

* I have selected the five year period after operation as the time to estimate apparent cure for the reason that consideration of the charts will disclose the important fact that after five years, the death rate of those who have undergone gastric resection for carcinoma is approximately the same as that of the general population group of similar age and sex.

to the probable course of events, than to great uncertainty. When the condition is inoperable, any information which can be given as to the expectation of life, the nature of the symptoms which probably will mark the course of the disease, and what can be expected from the treatment of these symptoms, is most gratefully received. Similarly, in those cases in which the growth can be removed, or some palliative procedure can be carried out, the family should be informed of the facts on which prognosis is based and it is with a consideration of these facts that the remainder of this paper is concerned.

The findings to be reported here, as they are related to prognosis, are based on a series of 4,793 cases of gastric carcinoma in which operation was performed in The Mayo Clinic in the period 1906–1931. In 2,112 of these cases the growth could be removed either for palliation or in the hope of cure. This is a rate of operability of 45 per cent, based on the patients subjected to exploration, and of only 19 per cent, based on the number of patients concerning whom a diagnosis of cancer of the stomach was made. In 17 per cent, palliative gastro-enterostomy was done, and in 38 per cent, neither resection nor gastro-enterostomy seemed advisable (Table I). The expectation of life in the group in which exploration revealed the disease too advanced for either gastric resection or gastro-enterostomy was five months. In the group in which gastro-enterostomy was performed, the expectation of life was only one month more, or six months, and the mortality relative to the operation was 11 per cent.

TABLE I

CARCINOMA OF STOMACH
HOSPITAL MORTALITY FOR CERTAIN MAJOR OPERATIONS
1906 TO 1931, INCLUSIVE

Operation	Number	Hospital Mortality	
		Number	Per Cent
Partial gastrectomy	2,112	295	13.9
Gastro-enterostomy	833	96	11.5
Exploration	1,848	64	3.5
Totals	4,793	455	9.4

In the cases in which the growth was removed, the hospital mortality was 13.9 per cent (Table I). As is evident in Chart 1 the mortality seems to vary with the attitude of the surgeon toward the cases in which the disease is greatly advanced, for in some years the mortality has been as high as 23 per cent and in others as low as 8 per cent (120 cases with ten deaths). A low mortality is chiefly dependent on proper preparation of the patient for operation and meticulous attention to all those details which lessen the likelihood of development of the two chief causes of death in such cases; namely, peritonitis and pneumonia.

Many factors may be taken into consideration in estimating prognosis when the growth can be extirpated: namely, the age of the patient; the duration of the symptoms; the gastric acidity; the size, situation and extension of the lesion (into the serosa, lymph nodes, and so forth), and the pathologic characteristics. Although some of these factors proved to be of little significance, they are at least interesting and contribute to better knowledge of the basis of prognosis.

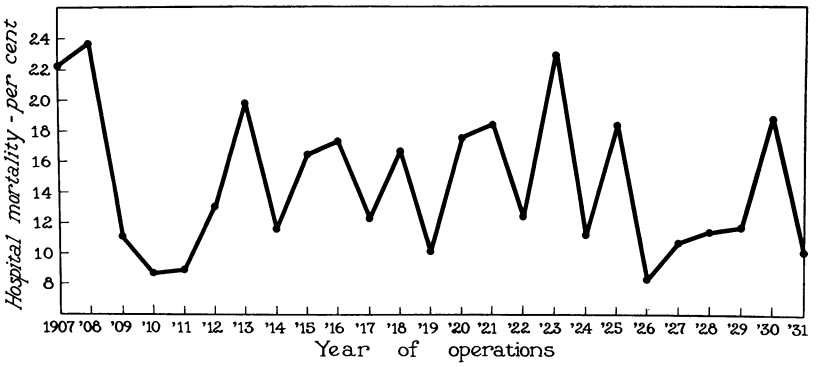

CHART 1.—Hospital mortality in operations for gastric carcinoma (1907–1931).

In so far as age is concerned, it is shown in this series that the percentage of five year survival in the disease is higher among the older patients (33 per cent in the age group of 45–54 as contrasted with 25 per cent in the 35–44 group) (Chart 2).

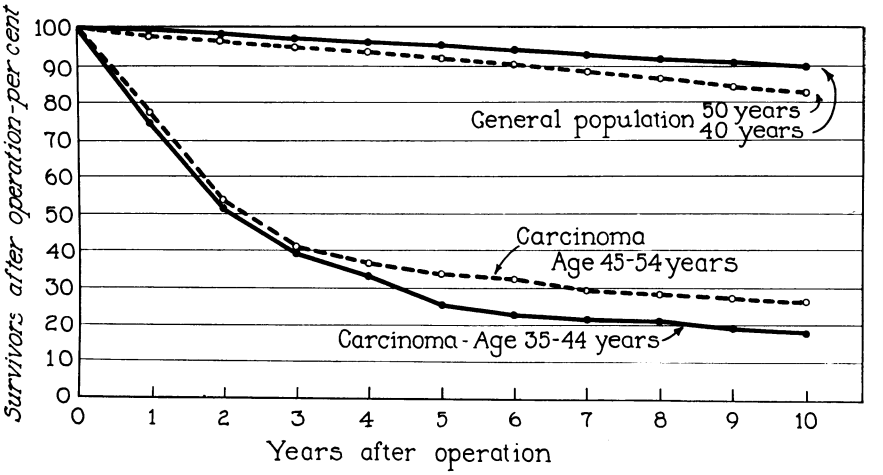

CHART 2.—Significance of age in curability of gastric carcinoma.

The length of history disclosed the interesting fact that five year survivals were more frequent among those cases in which gastric symptoms were of longer duration, for among those patients whose symptoms had been present for 12 months or more, 35 per cent lived five years while among those

whose symptoms had been present for six months or less, 25 per cent were alive and apparently well at the end of five years (Chart 3).

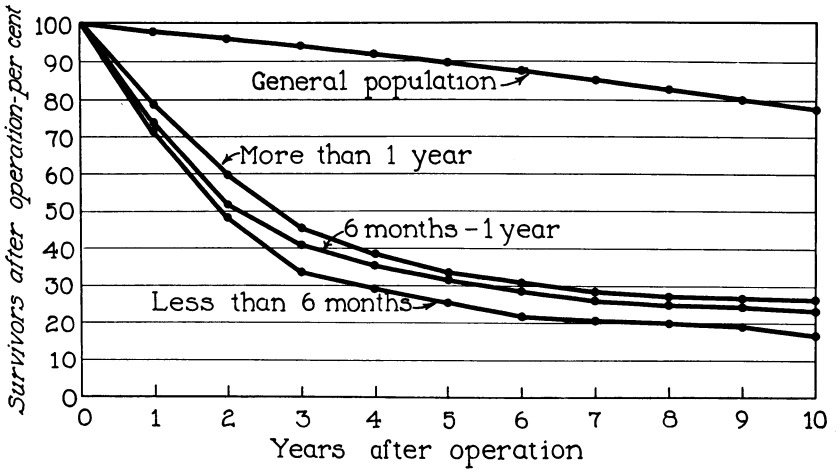

CHART 3.—Significance of duration of symptoms in prognosis following gastric resection for carcinoma.

In respect to the significance of secretory function of the stomach, I always had thought that the patient who had normal secretory activity would not have as good prospect of cure as one with less active function; yet this series shows the reverse, for among those patients whose secretory function was approximately normal, the five year survivals were 15 per cent more than among those whose secretory function was markedly diminished or absent (Chart 4).

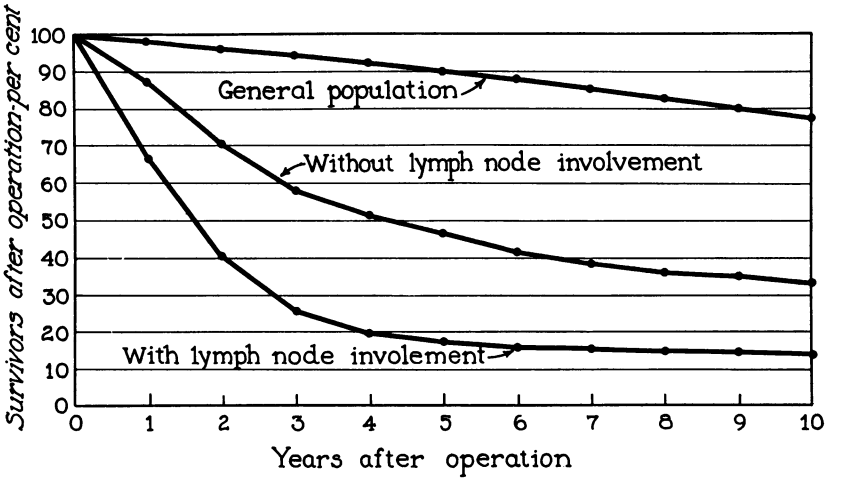

CHART 4.—Significance of gastric acidity on postoperative results.

Investigation of survival, based on the size of the lesion, disclosed the curious fact that there was greater expectation of life among patients who had the larger lesions than among those who had the smaller lesions. This

is probably attributable to the fact that the smaller lesions are more likely to be of a penetrating character and also of a higher degree of malignancy than the larger lesions. Survival of patients who had the larger (60 sq. cm.) lesions was compared with survival of patients who had the smaller

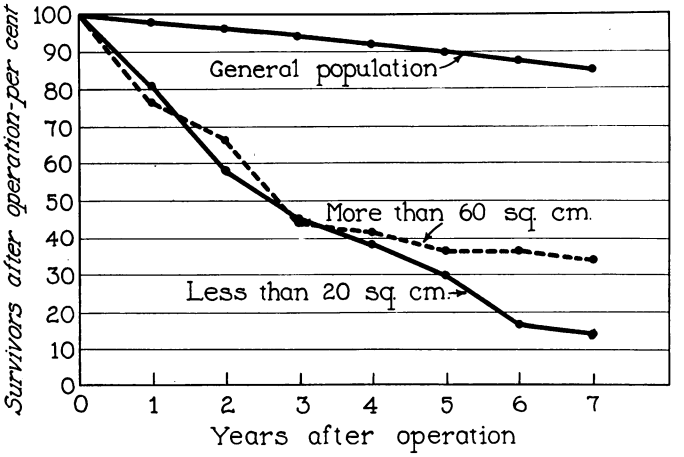

CHART 5.—Influence of size of lesions on results of gastric resection for carcinoma.

(20 sq. cm.) lesions; five years after operation, about 10 per cent more of the former than of the latter were living (Chart 5).

The situation of the lesion is of significance and in this series (Chart 6), the observation of others is confirmed; namely, that the nearer the lesion

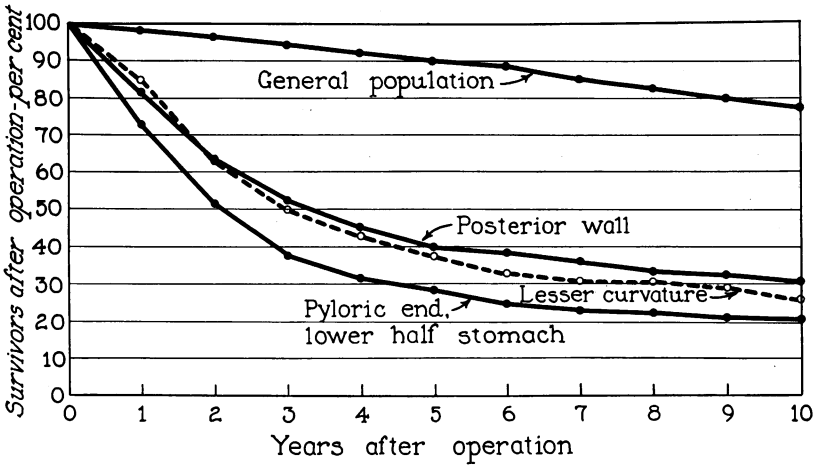

CHART 6.—Significance of site of lesions on results following gastric resection.

is to the pylorus, the more difficult it is to cure, and removable lesions in the body of the stomach are accompanied by a distinctly higher rate of survival than are those near, or involving, the pylorus (40 per cent compared to 28 per cent). This may be attributable to the fact that regional lymphatic

structures are more easily removed with thoroughness when they are in the former situation than in the latter, and also to the fact that not enough attention has been given to the importance of removing, in the resection, a segment of the first portion of the duodenum. It has been shown that although gross involvement of the duodenum is exceedingly rare in cases of cancer of the stomach, microscopic invasion not infrequently can be demonstrated.

The extension of the lesion has great significance in prognosis. Involvement of serosa was shown by Gray to decrease the possibility of cure by approximately the same per cent as involvement of lymph nodes, which, as with cancer in all situations, lessens curability to a marked degree. Five years after operation for cancer of the stomach, as has been said earlier in this paper, 18 per cent of patients whose lymph nodes are involved and 48 per

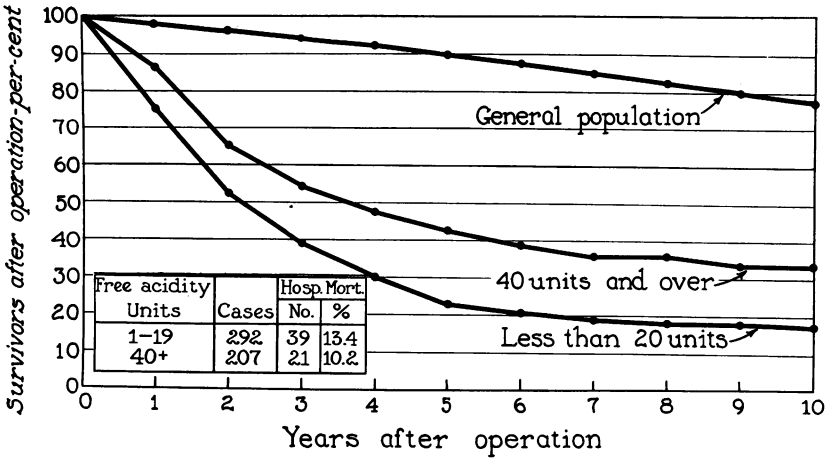

CHART 7.—Significance of involvement of lymph nodes on curability of carcinoma.

cent of those whose lymph nodes are not involved are alive. The difference then is 30 per cent (Chart 7).

The most accurate prognostic information obtainable in this series proved to be grading of malignancy by the method of Broders in which the degree of cellular differentiation is recorded as of Grades 1, 2, 3 and 4. Of patients whose carcinomata are of malignancy graded 1 and 2, 63 per cent are alive five years after operation, and ten years after operation 55 per cent of patients of this group are alive. These data can be contrasted with the fact that of patients whose carcinomata are of malignancy graded 3 and 4, only 20 per cent are alive five years after operation. These results again substantiate the fact that grading of malignancy stands first in importance in prognosis (Chart 8).

The coordination of these various factors has in our experience at the Clinic added definitely to accuracy in prognosis. This investigation also has supported the contention of surgeons that the surgical treatment of cancer

of the stomach can and does accomplish more than is recognized, and that constant repetition of this fact is the best approach to earlier recognition of the disease.

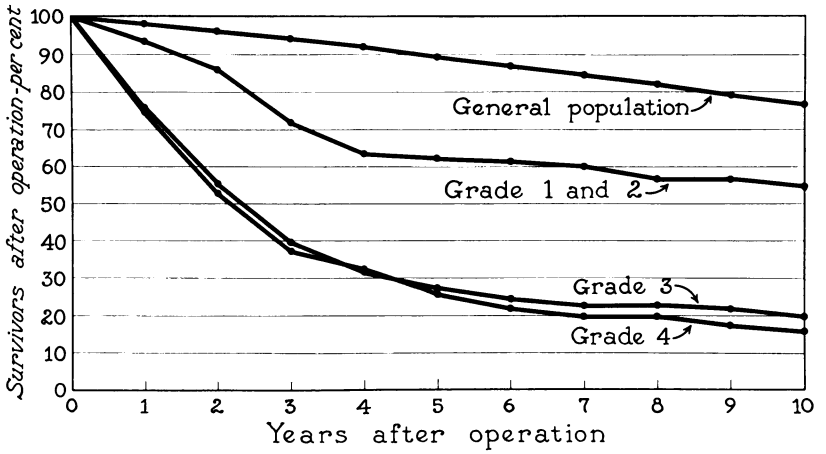

CHART 8.—Significance of histologic grading (Broders) on prognosis following gastric resection for carcinoma.

DISCUSSION.—DR. J. M. T. FINNEY (Baltimore, Md.).—I wish to express my own personal satisfaction and am sure I speak for the entire group, when I thank Doctor Balfour for bringing out so graphically and clearly certain points that from his wealth of material he has been able to bring to the fore, and for emphasizing a number of other points of great practical importance.

DR. HAROLD L. FOSS (Danville, Pa.).—In discussing Doctor Balfour's paper may I approach the subject from a slightly different angle? In his experience at Rochester, 19 per cent of the patients were not in condition to be aided by any form of treatment. It is as important as ever to keep before the public the paramount necessity of early diagnosis in malignant disease. It is estimated, in Pennsylvania, that there are over 100,000 patients suffering from some form of neoplastic disease. The United States census bureau reports that 43 per cent of all Americans live in rural districts. Those who work in medical centers, serving rural sections, have found it to be true that rural patients invariably come much later for treatment than is the case with the patient of the metropolitan areas. In discussing a paper recently presented by Doctor Lahey covering some 200 cases of gastric carcinoma, I reviewed an equal number of my own. Doctor Lahey's patients came from a large metropolitan area, mine from the rural districts of central Pennsylvania. While 30 per cent of the city patients showed weight loss, 70 per cent from the rural sections had it as a chief symptom. Thirty per cent from the Boston area were vomiting; 70 per cent from the rural district. About 5 per cent of Doctor Lahey's patients had had hemorrhages; about 30 per cent of ours. In the patients coming from the city, 25 per cent were operable; in my series, but 5 per cent. In the inoperable group there was no operation whatever in 36 per cent of the urban cases; in the rural group, none in 57 per cent. In only 11 of the 200 rural patients was it possible to perform a resection. Fifteen per cent of all patients admitted

to our hospital have some form of neoplastic disease, nearly always in an advanced form. Our patients with carcinoma of the breast wait 15 months before seeking aid; those with carcinoma of the colon 11 months from the onset of the symptoms. Those with gastric carcinoma delay, on the average, eight months.

In our state, and I think this is typical of all states, there is a large group of sufferers destined to be treated far too late. In the rural districts these patients have not been so much in need of surgery as of education. Nearly 50,000,000 of our people live in the country and they are the ones not being reached by the groups trying to do the things Doctor Balfour says are so important. As was stated in the paper, surgery of the stomach has probably reached as high a degree of technical perfection as is possible and it is not likely that much greater progress will be made by the roentgenologists or diagnosticians in their fields. More can be accomplished only if we can aid these agencies in the education of those people who are likely to develop cancer, or who have it, and who know nothing about the disease. I recently had as a patient the director of the Public Works Administration for Pennsylvania. He informs me that in our state the W. P. A. is spending over $20,000,000 a month—on roads and airports and bridges, *etc.* I asked what was being done regarding lay education on medical matters and he told me "nothing."

The mortality of cancer will not be decreased, and surely the operability of cancer of the stomach will not be increased, until patients can be seen far earlier. While the Society for the Control of Cancer, the American College of Surgeons, cancer commissions and other groups are, to a certain extent, reaching the patient of the larger medical centers, patients constituting nearly 50 per cent of our American population, those living in the rural sections, know nothing of this program of education or of the need for it.

Four billions of Federal money is being spent on all sorts of projects, most of them, no doubt, meritorious. Why not take 25 millions of this, say but one month of Pennsylvania's allotment, for lay education dealing with the menace of malignant disease, its prevention and early eradication, especially lay education among our rural patients? No one could doubt but that thousands of lives would be saved and incalculable suffering prevented.