

END-RESULTS IN THE TREATMENT OF CARCINOMA OF THE STOMACH*

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This study was undertaken with the object of determining the final results of the treatment of carcinoma of the stomach in a general hospital, and of evaluating some of the numerous factors contributing to these results. While there is an abundant literature, particularly on the operative treatment, there is a comparative dearth of data regarding the end-results in the total number of patients diagnosed as having carcinoma of the stomach in any one institution or community. Many of the reports in the literature have emanated from large clinics where the cases frequently represent more or less selected groups from a large area rather than a cross-section of the disease in a community. Frequently the data have included only cases occurring on the surgical wards, and thus the statistics are made still more highly selective. In addition, if an adequate idea of the effectiveness of the profession in combating a given disease is to be obtained, the results should be expressed in terms of the total disease existing in the community.

The data for this report were taken from the records of the New Haven Hospital for the ten-year period 1920 to 1930. The admissions to this hospital are fairly representative of a cross-section of the community, the hospital having 71 per cent of its patients on the wards, 13 per cent semiprivate and 16 per cent private. All of the patients admitted to the hospital, medical and surgical, in whom a diagnosis of carcinoma of the stomach was definitely established have been included. Those cases where the diagnosis was questionable, usually occurring on the medical service in patients who refused operation, were excluded. Cases in which there was a questionable pathological diagnosis as between benign and malignant ulcer, sarcoma, syphilis, etc., were excluded. The report includes all carcinomas of the stomach,—cardia, fundus and pylorus. Thirteen of the 120 cases were in the cardia and the remainder in the fundus, corpus or pylorus.

Data

In this study of 120 cases no attempt has been made to determine possible etiological factors but, rather, emphasis has been

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placed on the diagnosis and results of treatment. Of the patients 13 per cent gave a history of cancer in one or more members of the family, but only 4 per cent of these were stated to be of the gastro-intestinal tract.

TABLE I
SEX INCIDENCE IN 120 CASES

<i>Sex</i>	<i>No. of Cases</i>	<i>Per cent</i>
Male	85	70.8
Female	35	29.2

TABLE II
AGE INCIDENCE IN 120 CASES

<i>Age</i>	<i>No. of Cases</i>	<i>Per cent</i>
31-40 inc.	6	5.0
41-50 inc.	24	20.0
51-60 inc.	34	28.3
61-70 inc.	44	36.7
Over 70	12	10.0

Inasmuch as early diagnosis is the major problem and *sine qua non* of the treatment of cancer of the stomach, particular attention was directed toward the early symptoms of the disease. Table III shows the incidence of early symptoms.

TABLE III
ANALYSIS OF EARLY SYMPTOMS IN 120 CASES

<i>Symptom</i>	<i>No. of Cases</i>	<i>Per Cent</i>
Abdominal Discomfort	76	63.3
Loss of Weight	71	59.2
Constipation	60	50.0
Eruclation	54	45.0
Anorexia	48	40.0
Vomiting	40	33.3
Regurgitation	16	13.3
Diarrhea	9	7.5

An attempt was made at first to classify the various types of abdominal pains, aches or discomfort, but it became apparent that this would be inaccurate because of the variety of terms used by different historians. The term "abdominal discomfort" is therefore used to include all of these symptoms. It should be emphasized that the classical boring pain associated with carcinoma of the stomach is *never* present as an early symptom. The discomfort was usually described as an ache or sense of fullness in the epigastrium or entire abdomen after meals. In many instances this early discomfort was described as indigestion or dyspepsia and attributed to an indiscretion in diet. In the cases with mild obstruction there was usually a history of the patients having altered their diet by a process of trial and error so as to have a minimum of discomfort. Frequently recurring in these histories was a story of indigestion following the eating of meat. The loss of weight was usually slight, averaging less than ten pounds. There was nothing characteristic of the type of constipation, although it was frequently complained of by patients who had not been previously constipated. The eructations were frequently described as sour and often were associated with the eating of meat or coarse foods. The anorexia was usually the result of the abdominal discomfort after eating. Vomiting was mostly limited to those patients having obstruction, as was regurgitation also.

TABLE IV
PATIENTS HAVING HISTORY SUGGESTIVE OF ULCER

<i>Ulcer History</i>	<i>No. of Cases</i>	<i>Per Cent</i>
Present	26	21.6
Absent	94	78.4

In Table IV are shown the cases having a history suggestive of peptic ulcer. The criterion for a positive history of ulcer was pain in the epigastrium relieved by food and alkali. In these cases not only was the history typical, but they frequently experienced relief of symptoms on a bland diet and frequently passed through periods of relief followed by exacerbations typical of ulcer. These symptoms were found to have been present in 50 per cent of this group

for more than one year and in 33 per cent for more than two years. The longest history was one of twenty years' duration, the diagnosis having been made at autopsy after the patient had died of hemorrhage from a supposed gastric ulcer. Nearly all of these patients had received treatment for ulcer prior to admission to the hospital, and among the errors in diagnosis "ulcer of the stomach" headed the list. It will be noted that in Table V about 15 per cent of the patients had histories of over two years' duration, and it was thought that most of those having a history of ulcer would be found in this group. However, this did not prove to be correct as the patients with ulcer histories were found in groups of both long and short duration. The following is a typical history:

B. H. No. 22231

Age 64

Male

This patient entered the hospital July 16, 1923, complaining of burning pain in the epigastrium. The present illness began in 1912, when he began to have attacks of burning pain in the epigastrium occurring 3-4 hours after meals and always relieved by food. These attacks would persist for several weeks or months at a time and then disappear only to recur again after an interval of several months. For the five months preceding entrance to the hospital the attacks had been more severe and persistent, and were associated with some distention of the abdomen. He complained of belching and passed much flatus. The pain was burning in character, localized in the epigastrium, and relieved by sodium bicarbonate and food. Just before entrance to the hospital the pain had at times radiated to the back. He was occasionally nauseated but had never vomited. Three weeks before entrance he had on one occasion noted tarry stools and for some time he had had mild constipation. During the past two years he had lost ten pounds. The remainder of the history was negative.

Physical examination on admission revealed a well-developed man with very little evidence of loss of weight and not appearing acutely ill. The abdomen was negative except for slight tenderness to the right of the umbilicus. The patient was having rather brisk bleeding as evidenced by the constant blood in the stool examination, and an erythrocyte count ranging between two and three million and a hemoglobin of 50 to 65%. The roentgen diagnosis was duodenal ulcer. The patient was placed on a strict ulcer regime for three weeks but as the bleeding continued and his general condition had grown rapidly worse, operation was advised.

At operation a large carcinoma was revealed on the lesser curvature of the stomach. There were enlarged glands in the lesser omentum and the mass was adherent to the pancreas. In spite of the poor condition of the patient a resection was carried out. As the resection progressed enlarged nodes were also found in the pancreas. There were no other evidences of metastases. Following operation the patient grew steadily worse and died.

The pathological examination showed a large infiltrating carcinoma with the

bulk of the growth extra-gastric in the surrounding tissues. On the surface was a shallow ulcerated area, but there was no evidence other than the history that this tumor had arisen on a previous gastric ulcer.

The duration of symptoms from onset to admission to the hospital is shown in Table V. An attempt was made to determine the cause for delay in the 40 per cent of patients having symptoms for

TABLE V
DURATION OF SYMPTOMS FROM ONSET TO ADMISSION TO HOSPITAL

<i>Time</i>	<i>No. Cases</i>	<i>Per cent</i>
Under 6 months	50	41.7
6-12 months	25	20.8
1-2 years	30	25.0
2-3 years	3	2.5
3-4 years	5	4.2
4-5 years	—	—
5-6 years	1	0.8
6-7 years	2	1.7
7-8 years	—	—
8-9 years	1	0.8
9-10 years	1	0.8
10-11 years	1	0.8
20 years	1	0.8
Total	120	—

over one year, but the information was not available in all. In the majority of these patients the diagnosis was made after entering the hospital, and in almost all of these gastric analysis or roentgenograms had not been previously carried out.

In Table VI are grouped some of the results of roentgenographic examination, gastric analysis and stool examinations. The roentgenographic examination was complete and recorded in 104 cases. In the remaining 16 the examination was not done because of the critical condition of the patients. The term "positive" is used to designate a definite diagnosis of carcinoma of the stomach. The cases grouped as doubtful were those in which some pathology was

TABLE VI
RESULTS OF ROENTGENOGRAPHIC EXAMINATION

<i>No. Cases</i>	<i>Positive</i>	<i>%</i>	<i>Doubtful</i>	<i>%</i>	<i>Negative</i>	<i>%</i>
104	84	80.7	13	12.5	7	6.7

GASTRIC ANALYSIS

<i>No. Cases</i>	<i>Free HCl absent</i>	<i>%</i>	<i>Blood present</i>	<i>%</i>
75	63	84	57	76

STOOL EXAMINATION

<i>No. Cases</i>	<i>Blood Present</i>	<i>Per cent</i>
78	51	62.8

evident, but the nature of this could not be determined and in the majority of these a diagnosis of ulcer was made. In the 7 negative cases, the roentgenographic examination after a barium meal showed a normally functioning stomach and no evidence whatever of gastric pathology. The gastric analyses were not always complete, hence only the presence or absence of free HCl and blood is recorded. Inasmuch as it was frequently not recorded whether the patients were on a meat-free diet or not, the presence of a four-plus guaiac was taken as evidence of blood in the stool. In many of the tests in which no blood was found only one stool had been examined and hence the percentage (62.8) in which blood was present is undoubtedly lower than if more examinations had been carried out in the negative cases.

In Table VII, giving an analysis of operability, the term "palliation" includes four gastrotomies for carcinoma of the cardia and two cases of drainage of abscess for perforated inoperable carcinoma, while the remainder of the palliative procedures were gastro-enterostomies. These cases are also included in the palliative group in Table VIII. The radical gastric resections were all Polya or Bill-

roth II except for one case in which a Billroth I anastomosis was carried out. Three of the radical resections were attempted in carcinoma of the cardia, all resulting fatally. In three cases it was necessary to resect a portion of the transverse colon involved in the growth. In all of the 79 cases operated on metastases or enlargement of the local lymph nodes were already present. In most of these the metastases in the lymph nodes were demonstrated by microscopic examination.

TABLE VII
ANALYSIS OF OPERATIVE TREATMENT

<i>Treatment</i>	<i>No. of Cases</i>	<i>Per cent</i>
Refused	11	9.2
Inoperable	30	25.0
Exploration	26	21.7
Palliation	34	28.3
Radical	19	15.8
Total	120	—

TABLE VIII
OPERATIVE MORTALITY

<i>Operation</i>	<i>No. of Operations</i>	<i>No. of Deaths</i>	<i>Mortality %</i>
Exploration	26	1	3.8
Palliation	34	11	32.3
Radical	19	10	52.6
Total	79	22	27.8

Table IX gives the duration of life from the onset of symptoms to death in 119 cases. The one patient who could not be traced had had an exploratory laparotomy at which an inoperable carcinoma was found and may be unquestionably considered as dead. Only 4 patients of the 120, or 3.3 per cent, are still living. All of these patients had radical resections of the stomach, and are as follows:

M. G. No. 95317 living 3 years and 2 months after onset of symptoms and 14 months after operation is now in good health. B. T.

TABLE IX

DURATION OF LIFE FROM ONSET OF SYMPTOMS TO DEATH

<i>Time</i>	<i>No. Cases</i>	<i>Per cent</i>
Under 6 months	36	30.0
6-12 months	30	25.0
1-2 years	21	17.5
2-3 years	15	12.5
3-4 years	5	4.2
4-5 years	2	1.7
5-6 years	—	—
6-7 years	1	0.8
7-8 years	—	—
8-9 years	2	1.7
9-10 years	1	0.8
10-11 years	1	0.8
20 years	1	0.8
Still living	4	3.3
Untraced	1	—
Total	120	0.8

Number of cases followed 119 or 99.2%

No. 91123 living 2 years and 4 months after onset of symptoms and 13 months after operation is now in good health. E. R. No. 10113 living 10 years after onset of symptoms and 9 years 4 months after operation is now in good health. This patient had an adenocarcinoma of the pylorus with metastases to the local lymph nodes. L. S. No. 70472 is now living 10 years after onset of symptoms and 4 years after operation. This patient likewise had an adenocarcinoma of the pylorus with metastases to the local lymph nodes; in December, 1931, a carcinoma of the rectum was discovered.

It was thought that those patients receiving surgical treatment might show a longer duration of life than those of the untreated group. Table X shows the results of such a comparison, in which the duration of life is calculated from the date of operation, and from the date of admission to the hospital, to death.

TABLE X

	<i>Duration of Life from Operation to Death</i>			<i>Duration of Life from Admission to Hospital to Death</i>			
	<i>Exploration</i>	<i>Palliative</i>	<i>Radical</i>	<i>Inoperable</i>	<i>Refused</i>	<i>Total</i>	<i>Per cent</i>
Operative Deaths..	1	11	10	—	—	22	18.3
Under 6 months....	22	16	2	21	7	68	56.7
6-12 months	—	2	1	6	3	12	10.0
1-2 years	1	4	1	2	—	8	6.7
2-3 years	1	1	1	1	1	5	4.2
Still living	—	—	4	—	—	4	3.3
Untraced	1	—	—	—	—	1	0.8
Total	26	34	19	30	11	120	—

Discussion

Vital statistics have shown that the death-rate from cancer throughout the country is steadily increasing. It is not the purpose of this article to speculate as to why this condition exists but rather to present the facts regarding one type of carcinoma in this community. Since the advent of the Roentgen ray and of radium great changes have taken place in the treatment of malignant disease in various portions of the body. However, in carcinoma of the stomach it is generally accepted that radical operative procedures offer the only hope of cure. It follows, therefore, that the number of patients who have been offered the opportunity of cure by means of radical resection will give some index of the effectiveness of the medical profession in combating such a disease. In Table XI it is seen that only 8.6 per cent of the patients dying of carcinoma of the stomach have been offered such an opportunity of cure. Even this figure is too high because of the fact that radical procedures have been attempted in many instances in almost hopeless cases. Furthermore, if one deducts the immediate operative mortality the figure is reduced to only 3 or 4 per cent of these patients who are even offered the opportunity of cure.

It is interesting to note that Saltzstein and Sandweiss, in studying 365 consecutive deaths from carcinoma of the stomach in Detroit, found that 3 per cent had been offered such an opportunity for cure.

The question then arises as to why so few of these patients can be subjected to radical procedures with a hope of cure. In Table XI it will be seen that only 44 per cent of these patients entered a hospital where a diagnosis was established, which may be taken as some indication of the care exercised in diagnostic studies. In the Detroit series of Saltzstein and Sandweiss 60 per cent of the patients were in hospitals, 28 per cent had some type of operation and 8 per cent were submitted to radical procedures, which figure, after deducting the operative mortality, was reduced to 3 per cent. One may raise the question as to whether these discouraging figures are the cause or the result of the present general hopelessness and pessimism expressed by laymen and physicians.

TABLE XI
CANCER STATISTICS OF NEW HAVEN RESIDENTS FOR 10-YEAR PERIOD (1921-31)*

Total deaths from cancer in New Haven Residents	1820	Detroit Series of Saltzstein and Sandweiss
No. of N. H. Residents dying of cancer of stomach..	524	
No. of N. H. Residents diagnosed cancer of stomach in hospitals	233 or 44%	60%
No. of N. H. Residents operated on for cancer of stomach	116 or 22%	28%
No. of N. H. Residents having gastric resections for cancer of stomach	45 or 8.6%	8%

The above statistics would *a priori* seem to indicate that late diagnosis is the chief factor responsible for the present discouraging results, and lead one to ask whether an early diagnosis is possible with the diagnostic procedures available at present. In Table IV is given the duration of symptoms from onset to admission to the hospital. It is likely that many of these patients had experienced mild symptoms for a period longer than is recorded in the history, as it is the rule for patients to minimize their early symptoms. In this series 41.7 per cent of the patients had had symptoms for less than 6 months. Cheever found, in his study at the Peter Bent Brigham Hospital, that 50 per cent had had symptoms for less than 6 months. If one assumes that 6 months is a reasonable period in which to make a diagnosis or advise hospitalization there remain

* I wish to express my appreciation to Mr. Herbert Hirsche, Secretary of the Cancer Control Committee of New Haven, for the assistance rendered in compiling these statistics.

nearly 60 per cent in which this is not accomplished, and nearly 40 per cent of these patients have complained of symptoms for a year or more before a diagnosis is made or they have entered a hospital. The responsibility for this delay must be shared by the physician and the patient. Undoubtedly a number of these patients were advised to enter a hospital but for one reason or another they had delayed. In some instances the patient had minimized or disregarded his symptoms and failed to visit a physician until just before entry to the hospital. In most, however, where the symptoms were of longer duration, the patient had visited several physicians, and in one instance twelve different physicians had been consulted over a period of two years prior to admission.

It is easy to state that in 50 per cent of these cases the diagnosis should have been made earlier, and it is quite another matter to point out exactly how this can be accomplished. Neither this study nor any similar one on record in the literature reveals a symptom-complex characteristic of the early stages of carcinoma of the stomach. It may be well to point out a fact which is still not too well recognized, namely, that cancer of the stomach is not a disease of old age only, but is common in middle age and occasionally under thirty. In this study 25 per cent were under fifty years and 53 per cent were under 60 years of age. In the group of cases reported by Cheever 34 per cent were under fifty, while in the group reported by St. John 37 per cent were under fifty and 76 per cent were under 60 years of age. In this study the longest duration of symptoms was found in the decade from 40 to 50, and 80 per cent of these had had symptoms for more than six months. In general, the older the age group the shorter the duration of symptoms except for those under forty years, who usually had a history of short duration.

An analysis of the early symptoms in this group of cases agrees with what has previously been pointed out by many writers, namely, that the early diagnosis of cancer of the stomach cannot be made by signs and symptoms alone. The symptoms are insignificant in themselves, but in the aggregate should point the way to the more exact laboratory tests and roentgenographic studies. If the physician waits to make the diagnosis by the signs and symptoms alone, he will have waited too long. The classical syndrome of pain, cachexia, mass and vomiting appear only in the terminal stages of the disease. A frequently recurring history in these cases was that of continued treatment for "indigestion", "dyspepsia" and "ulcer of the stomach",

without the serious import of these symptoms being recognized and the more exact means of diagnosis being resorted to. Among the mistakes in diagnosis gastric ulcer headed the list, and as 21.6 per cent of these patients gave a history suggestive of ulcer, one may well consider the serious responsibility assumed in making a diagnosis of gastric ulcer without resorting to every means available to ensure its accuracy.

It is not an infrequent practise to leave to the roentgenologist the responsibility for deciding the diagnosis. Table VI reveals the fallacy of such a course, although the roentgenogram is undoubtedly the most exact single means of diagnosis available. In Cheever's report the roentgen diagnosis was correct in 93 per cent of the cases. In the group of cases studied by Saltzstein and Sandweiss, which is probably more representative of the average roentgen technic, 60 per cent of 300 patients had roentgenographic examination; 82 per cent of the hospital cases and 26 per cent of those not in hospitals were examined. In their total of 167 roentgenographic reports 67 per cent were positive, 19.8 per cent showed some lesion, and 13.2 per cent were misleading. They conclude that, "The roentgenologic diagnosis is not accurate enough to be used to the exclusion of other clinical interpretations." The following history illustrates the seriousness of this error.

G. A. No. 37265

Age 53

Female

This patient entered the hospital June 22, 1925, complaining of weakness and abdominal discomfort. The present illness began ten months before entrance to the hospital, when she suddenly vomited a quantity of blood. She had no pain or other symptoms. Following this she developed progressive weakness, anemia and anorexia, and remained at home in bed under the treatment of her doctor. She then entered the Johns Hopkins Hospital where further studies were carried out during a period of five weeks. Gastric analysis showed no free HCl in the stomach contents. Fluoroscopic examination and roentgenograms were negative except for "erosions" of the duodenum. Under a dietary régime and transfusions her symptoms disappeared, the hemorrhage ceased and she regained her normal weight. For a period of about two months she was able to assume even more than her normal activity. Two weeks before admission to the New Haven Hospital she had a recurrence of the epigastric discomfort and began to lose weight. This discomfort had no relation to meals. One week before entrance she experienced a sudden sharp pain in the right leg followed by discoloration of the foot. Physical examination revealed a well-developed woman with slight evidence of loss of weight and a definite pallor of the skin. Abdominal examination demonstrated a small non-tender tumor about the size of an egg situated to the right of the umbilicus. Gastric analysis gave a positive guaiac and no free HCl. Roentgenographic examination was negative. Stool

examination revealed a strongly positive guaiac. Her course in the hospital was steadily downward and on July 6 an exploratory laparotomy was performed. A carcinoma was found on the greater curvature of the stomach with metastases to the liver and omentum. Post-mortem examination demonstrated a diffuse infiltration of the wall of the stomach with no gross tumor mass which could have been demonstrated by roentgenogram. However, it would seem likely that a change in motility should have been demonstrated by fluoroscopic examination.

The results of gastric analysis as shown in Table VI are in much the same category as the roentgen findings, but it is an extremely valuable aid in the diagnosis with the advantage of being relatively inexpensive. Pollard and Bloomfield, in their extensive studies on gastric secretion, have summed up the evidence as follows: "Most cases of cancer of the stomach show a deficient gastric juice as evidenced especially by abnormally small volumes of secretion with low acidity or with absence of acid. A small proportion of the cases have secretory findings within normal limits. We have so far encountered no instance with acid or volume of secretion definitely above the average." Needless to say, the gastric analysis is of extreme importance in the differentiation of ulcer and carcinoma. While it is true that most of the gastric analyses have been carried out on late cases of carcinoma of the stomach and little is known of the early findings, most investigators—Bloomfield, Hurst and others—have presented evidence indicating that a deficient gastric secretion occurs very early in the disease, if not preceding the development of the carcinoma.

The results of treatment as reported in the literature are very difficult to analyze because the total number of patients seen is usually not reported. It is obvious that the results of any one procedure in a group of cases will depend on the selection of this group from the total number seen. Other conditions being equal, the smaller the number of cases operated on compared with the total number of cases seen, the better will be the results. Operative mortality will depend upon how widely the indications for operation are applied and how radically one operator proceeds as compared with another, as well as the numerous other factors such as pre- and postoperative care, individual skill, etc. This is well illustrated by Persson's statistics covering five-year periods from 1887 to 1926. In general, he shows that the higher the percentage of resections attempted the greater is the mortality. Thus his operative mortality for five-year periods in the same hospital ranged from 8.7 to 57.1

per cent, next to the highest mortality occurring during the last five-year period because of wider indications for resection. Table XII shows the correlation between the percentage of the total number of cases operated upon and the operative mortality. There is some evidence that the indication for radical resection has been too widely applied in the group of cases here reported. There is also some indication that palliative procedures have been attempted when perhaps a simple exploration with its much lower mortality would have been wiser. It should be noted that in this group of 79 cases operated upon, they all already had metastases to the local lymph nodes, but this is merely an indication of the stage of the disease and no contraindication in itself to a radical procedure as is evident by the living cases of long duration which are found both in this study and in others.

Almost every large hospital has a few patients who have apparently been cured following a gastric resection for cancer of the stomach. While this is hopeful and points the way to what should be accomplished in a larger group of cases, it gives no indication of the effectiveness of treatment as a whole. It was hoped that a comparison of the duration of life from the onset of symptoms to death in the operated and non-operated cases might show favorable results, but there was so little difference that they were grouped together in Table IX. Again, if one compares the duration of life from operation or admission to the hospital until death the results, except for the few cases in the radical group, are equally discouraging. However, the two groups are not strictly comparable as many of the palliative cases would undoubtedly have died at an earlier date if the obstruction had not been relieved. The group of cases in which no operation was performed gives some idea of the natural history of the disease in untreated cases since none of them lived over three years.

Among the questions which such a study should attempt to answer is whether the treatment of cancer of the stomach in this community is adequate or of as high a standard as can reasonably be expected. If only 8 per cent of these patients are offered a chance for cure by radical resection, it would seem that the treatment must be considered as inadequate. It is seen that 41.7 per cent of these patients have entered the hospital within 6 months of the onset of symptoms. It is not likely that much can be accomplished in this group where the symptoms have been of such short duration due to

TABLE XII

Group	New Haven Hospital ^A		Peter Bent Brigham Hospital ^B		Detroit Hospitals ^A		Presbyterian Hospital ^B	
	% of Total No. of Pts.	Operative Mortality	% of Total No. of Pts.	Operative Mortality	% of Total No. of Pts.	Operative Mortality	% of Total No. of Pts.	Operative Mortality
Inoperable or Refused	34.2%	—	57.5%	—	55.0%	—	56.6%	—
Exploration	21.7	3.8%	10.1	20.8%	13.6	58.6%	30.4	26.6%
Palliation	28.3	32.3	22.4	13.2	18.3	54.3	—	—
Radical	15.8	52.6	9.7	13.2	13.1	64.0	13.0	43.7
Total percentage of cases operated on	65.8	—	42.2	—	45.0	—	43.4	—
Average total operative mortality	—	27.8	—	15.0	—	58.7	—	31.8

^A Includes carcinoma of the cardia.
^B Does not include carcinoma of the cardia.

the location of the growth in the so-called silent areas of the stomach or to the rapid progress of the disease. However, 60 per cent of the patients have had symptoms for more than 6 months and 40 per cent for more than a year, and it is in this group that an earlier diagnosis should be possible.

It has been pointed out that the early diagnosis of cancer of the stomach cannot be made from the signs and symptoms alone. To quote the conclusions from the Detroit study: "The chief problem is not the recognition of the symptoms, but the arousal of suspicion that they may be of serious import." Indigestion and dyspepsia are not diagnoses but merely the symptoms indicating the need for more complete study. What then should be the next step in the investigation of these symptoms? As has been previously stated the roentgenogram with the barium meal is the most accurate single means of obtaining diagnostic aid. However, it is unfortunately expensive and this is probably the most frequent reason for withholding its use until the diagnosis is almost a certainty. The possibility of obtaining aid by fluoroscopic means, which is much cheaper, may be considered. If the fluoroscopic examination shows evidence of a lesion in the stomach, roentgenograms will then be needed to show its location and extent. If no lesion is seen in fluoroscopic examination, the roentgenogram is even more indicated to keep down the percentage of errors which are certain to follow if only a fluoroscopic examination is used. However, the fluoroscopic examination alone is better than no examination at all, and where funds are not available for a complete roentgenographic study, as is usually the case, the fluoroscopic examination alone is justified and indicated. Progress in the treatment of cancer of the stomach will be slow until adequate funds are made available for those who cannot afford the expense of a complete roentgenographic examination.

Another very valuable aid to diagnosis and one all too frequently neglected is the gastric analysis. It is particularly valuable in the differentiation of ulcer which is the most common error in diagnosis. As has been previously pointed out, the great majority of patients with cancer of the stomach have a low volume and low acid secretion. A few may be within normal limits but almost never do they have a high volume and high acid secretion. This test is particularly indicated because the evidence now points to the fact that these low values even precede the development of carcinoma. Thus, if there is a question whether the expense of a roentgenographic study is

justified, a patient having a high volume and high acid secretion may be more safely eliminated than one having low values. Stool examination on a meat-free diet should also not be neglected as is so frequently done.

In view of the fact that the early symptoms merely suggest the possibility of cancer of the stomach, what then are the minimum standards for making a negative diagnosis? It is clear that no one laboratory test can be relied on in all cases. Hence those which may yield positive information must necessarily be carried out. No age group can be eliminated, although cancer of the stomach under thirty is exceedingly uncommon. Given a patient with symptoms merely arousing the suspicion of cancer of the stomach, the diagnosis cannot be ruled out without (1) a negative gastric analysis under standard conditions, (2) negative roentgenograms and fluoroscopic examination, (3) negative stool examinations, and (4) if the diagnosis is still in doubt, an exploration may be justified as a small percentage of cases can be diagnosed in no other way.

Conclusions

1. The results of the treatment of cancer of the stomach in this community compare favorably with the study of Saltzstein and Sandweiss in Detroit, but the results do not measure up to the standard which can reasonably be expected in this disease.

2. The primary cause for the small number of patients offered the opportunity of cure (8 per cent) is the failure to make an early diagnosis, the responsibility for which must be shared by the physician and layman alike.

3. Sixty per cent of these patients have had symptoms for more than six months and 40 per cent for more than one year previous to entry to the hospital, and in this group a large number should have had an earlier diagnosis.

4. Too much emphasis has been placed on the late signs and symptoms of cancer of the stomach, and a more careful investigation of merely suspicious symptoms is needed.

5. Funds should be made available for roentgenographic examination in the large group of patients which at present cannot afford this essential diagnostic aid. This is one of the necessary steps for increasing the present small number of patients offered the opportunity for cure.

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