CHANGES IN SURGERY FOR CARCINOMA OF THE STOMACH 1940 through 1951

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CARCINOMA of the stomach continues to be a most perplexing problem both from diagnostic and therapeutic standpoints. Too often the cancer has been present so long and has spread so insidiously that removal is impossible. Wangensteen[1] estimates that the usual neoplasm has been present for 20 months before it causes any symptoms, and that six months elapse before the symptoms are sufficiently severe for the patient to see a doctor. It is not surprising that the most favorable reports show a resectability rate of only 50 to 60 per cent of these long existing lesions and that the five year survival rate is so low.

Several new developments in the surgical attack on gastric cancer have occurred during the past 10 to 15 years and may influence the outlook for the patient with carcinoma of the stomach. These changes have been: (1) Tissue diagnosis has replaced "clinical judgment" regarding operability; (2) It has been realized that operability cannot be determined by roentgen examination of the stomach; (3) Extension into the esophagus is no longer regarded as a contraindication to operation; (4) Extension into neighboring organs is not a contraindication to operation; (5) As has been indicated by Guiss,[2] "There is an increasing tendency to determine true resectability by laparotomy;" (6) Total gastrectomies have been advocated for carcinoma of Borrmann's type IV by some[1] and for all carcinomas of the stomach by others.[3,4,5,6,7] More recently Lahey[8] stated that he did not believe that total gastrectomy was indicated for the low prepyloric or antral lesions; (7) Wangensteen[1] has discussed the idea of "second-look" operations and McNeer et al.[9] have reported operations for recurrent gastric carcinomas.

We believe the preceding factors, reflecting a more aggressive approach to gastric cancer, will result in increased five year survival rates. We, as gastroenterologists and internists, are interested in the changes in surgery for cancer of the stomach, and in what affect these changes may have on the prognosis of the patients we observe with gastric carcinoma. Should the internist refer all his patients with gastric cancer to the surgeon, or should he select the ones to be referred? We attempt to show in this article the change in surgical approach to the patient with gastric cancer from the years 1940 through 1945 to the present time.

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1. Results of Surgery for Cancer of the Stomach 1940 Through 1945

The passage of time enables us to evaluate our diagnoses and treatment of gastric carcinoma in the years 1940 through 1945. These results have been published in more detail elsewhere,[10] but will be briefly reviewed.

Table 1

OPERABILITY, RESECTABILITY, AND CURABILITY
1940 through 1945

Group	No. of Patients	Per cent of Total Group	5 Year Survival
Resection performed	100	25	27 (6.6% of total group)
Palliation and exploration	135	33	0
Operation refused	44	11	0
Inoperable	127	31	2
TOTAL	406	100	29 (7.1% of total group)

Four hundred and six cases of carcinoma of the stomach were seen from 1940 through 1945. The resectability rate was 25 per cent (table 1). Palliative surgery or exploration only was performed in 33 per cent. Eleven per cent of the patients refused surgery. The percentage considered operable, including those who refused surgery, was 69 per cent of the total, although only 58 per cent were operated upon. Of the 235 patients operated upon, 43 per cent had gastric resections.

There were 29 five year survivals; two patients surviving for five years without surgery. One of these patients was considered inoperable in 1945 because of the extent of the disease disclosed by roentgen examination; he returned with increasing symptoms in 1951 at which time a gastric resection was performed. The other five year survivor without surgery had extension into the esophagus, as determined by esophageal biopsy, and was considered inoperable. It is remarkable that she survived for seven years before succumbing to her disease. Esophageal involvement and extent of the disease as determined by roentgen examination are no longer considered contraindications to operation. Both of these patients would be operated upon today and would be considered five year "cures."

The remaining 27 five year survivors represent 6.6 per cent of all the patients seen with gastric carcinoma from 1940 through 1945, and 27 per cent of those who had gastric resections. Twenty-three are alive and well today. Four have died, all with recurrences of carcinoma. The survival for five to seven years

after surgery with death following an extension of the original disease certainly indicates that five year survival does not mean five year "cure." The five year survival rate of 7.1 per cent compares favorably with other series of this period. Maimon and Palmer,[11] in reviewing other published series in 1949, stated "The incidence of five year survival in all patients with carcinoma of the stomach varies from 2.1 to 7.5 per cent." Series of cases, including all gastric malignancies such as Hodgkin's disease, lymphoblastomas, and lymphosarcomas of the stomach, should not be compared with series dealing strictly with gastric carcinoma, since the nonepithelial malignancies of the stomach have a much higher five year survival rate than gastric carcinoma, and will favorably affect the overall survival rate for gastric malignancies.

Of the 100 resections, eight were total, and seven were complicated resections in which some other organ was removed at the same time. One patient with extension of the disease to the gallbladder and liver, and another with extension to the tail of the pancreas and hilum of the spleen, are alive and well today. Forty-one per cent of the five year survivals had positive lymph nodes and 22 per cent extension of the disease to neighboring organs, indicating that such lymph node involvement and extension of the disease do not necessarily mean that the patient is nonresectable and noncurable. It should also be noted that a palpable mass was present on physical examination of six of the five year survivors, showing that the presence of a mass is not a contraindication for operation.

The gross pathology of the lesion, as has been reported by others, is of considerable prognostic value. This is presented in table 2. The most favorable prognoses were those for polypoid lesions; 58 per cent of these patients survived. Seventeen per cent of the patients with ulcerating lesions survived, 22 per cent of those with annular lesions survived, and only 13 per cent of those with infiltrating lesions survived. Unfortunately the majority of the lesions are of the type that have a poor prognosis.

Table 2

GROSS PATHOLOGY AND SURVIVAL

Pathologic Condition	Survivals	Died	Total	Per cent Survivals
Polypoid	15	11	26	58
Ulcerating	7	35	42	17
Annular	2	7	9	22
Infiltrating	3	20	23	13

Palliative surgery (gastroenterostomy in 43, gastrostomy in three, loop colostomy in one, and a closure of a perforation in one) was performed in 48 patients, and exploration only in 87 patients: a total of 135 patients. Distant metastases, such as the presence of a Blumer's shelf, peritoneal seeding, and liver metastases, were the indications which made gastric resections inadvisable in 51 patients. Extension to other organs (30 patients), and lymph node involvement in 45 patients were other reasons for not resecting the stomach. We believe that today some of the latter 75 patients would have had resections.

The importance of tissue diagnosis was emphasized by the course of several patients. One had a gastroenterostomy for what was thought to be a penetrating, nonresectable, malignant gastric ulcer. Tissue diagnosis was not obtained. Following the gastroenterostomy, the ulcer healed and has remained healed to the present time. It is obvious that this ulcer must have been benign rather than malignant. Three other patients were considered nonresectable because of omental nodes or peritoneal implants; permanent microscopic sections were negative for tumor cells. Frozen sections, which were not used from 1940 through 1945 as they are at the present time, can be of considerable help to the surgeon in determining the advisability of resection in such questionable cases.

One hundred and twenty-seven patients were considered inoperable. The chief reasons are presented in table 3. Physical examination determined the nonoperability in 63 patients; 20 had fixed masses. This would seem to be a questionable contraindication since six of the five year survivors had masses on physical examination. Hepatomegaly, and even a nodular liver, does not necessarily mean the patient has metastases, but may represent a concomitant cirrhosis. Tissue diagnosis was not usually obtained in these patients in 1940 through 1945.

By roentgen examination the disease was considered too extensive for operation in 25 patients. Two patients so considered, but not included in this series, were treated with small doses of roentgen therapy by their local physicians, and are alive and well today. They obviously did not have carcinoma, but perhaps had hypertrophic gastritis. This again emphasizes the importance of obtaining a tissue diagnosis and the doubtful reliability of determining operability by roentgen examination of the stomach. Esophageal involvement, usually determined by roentgen examination, was the primary reason for not operating on 19 patients. With improvement in surgical technic, esophageal involvement is no longer considered a contraindication to surgery.

We believe if the modern concept of the most extensive possible surgery for cancer had been accepted, 71 of the 127 patients considered inoperable could have been subjected to surgery with at least a chance of a five year survival in a few. Certainly, without gastric resection, their future outlook was hopeless.

Table 3

REASONS FOR NONOPERABILITY

	Number of Cases
Recurrence (previous surgery)	5
Physical examination	63
Fixed mass	20
Hepatomegaly	7
Nodular liver	10
Blumer's shelf	20
Ascites	4
Virchow's node	2
Roentgen examination	25
Esophageal involvement	19
Metastases (distant—x-ray evidence)	14
Gastroscopic examination	1
	TOTAL 127

2. Changes in Surgery

The resectability and operability rates (the actual percentage of patients operated upon) for the years 1940 through 1945 and subsequently through 1951 are presented in Chart I. The operability rate in 1940 through 1945 was 57 per cent and rose gradually until it was 82 per cent in 1950, and 86 per cent in 1951.

Similarly, the percentage of patients undergoing gastric resection has increased. Only 25 per cent of the patients had gastric resections in 1940 through 1945, while in 1950 the percentage rose to 51 and in 1951 was 49 per cent. With the resectability rate doubled, there is a much greater chance for salvage and for five year survival than in the former years.

Other changes in the surgical approach to gastric carcinoma are illustrated in Chart II. Total resections have increased from 2 to 9 per cent. Total resection is not performed routinely, as has been advocated by some, but is done for any lesion, usually scirrhous and infiltrating, demanding entire removal of the stomach for adequate normal gastric margin. Complicated resections, in which some other organ such as the spleen or pancreas had to be removed at the same time, increased from 2 to 15 per cent. We believe that this is most important, since we have shown that some patients have been five year survivors even

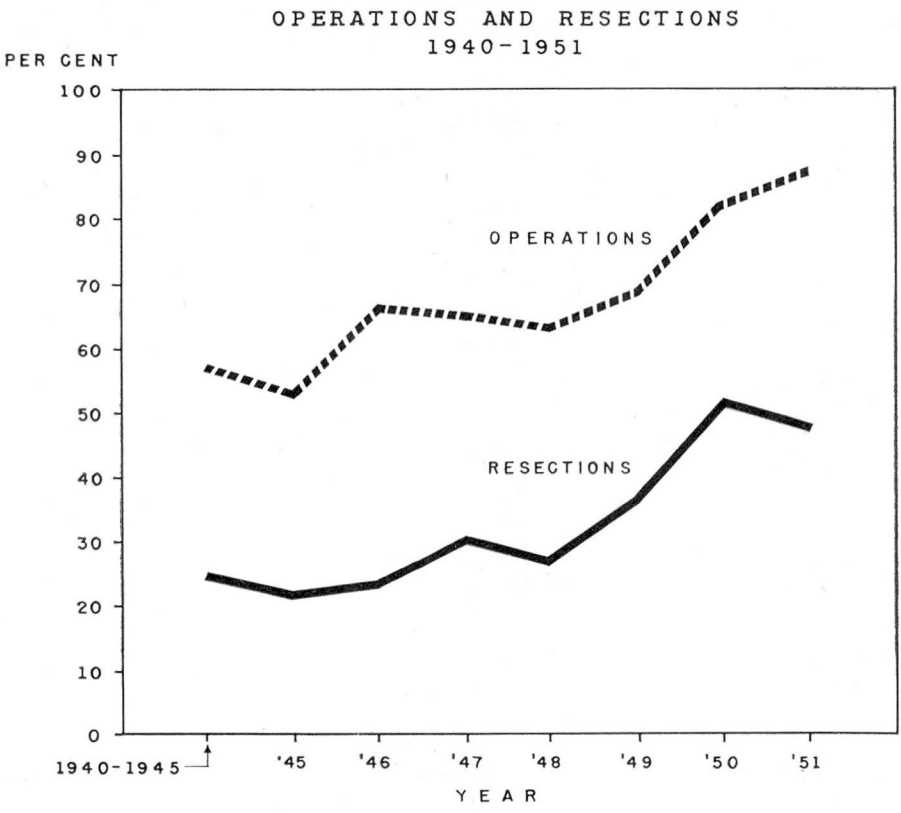

Chart I

though they had extension of the disease to some other organ at the time of operation.

Postoperative mortality has not changed appreciably during this period. From 1940 through 1945, 406 patients with gastric carcinoma were seen; 100 patients underwent resections with nine postoperative deaths, a mortality rate of 9 per cent. In 1950 and 1951, 170 patients were seen; 84 underwent gastric resections with eight postoperative deaths, a mortality rate of 9.5 per cent. Many of the eight patients who died following gastric resection had extensive involvement and probably would not have been five year survivors. At the present time, more extensive surgery is being performed, more total resections, and more complicated resections when the disease has extended beyond the stomach to other organs. There has been no increase in postoperative mortality rate.

The percentage of resections among those patients with gastric cancer whom we observed has increased from 25 per cent to 49 per cent. The per-

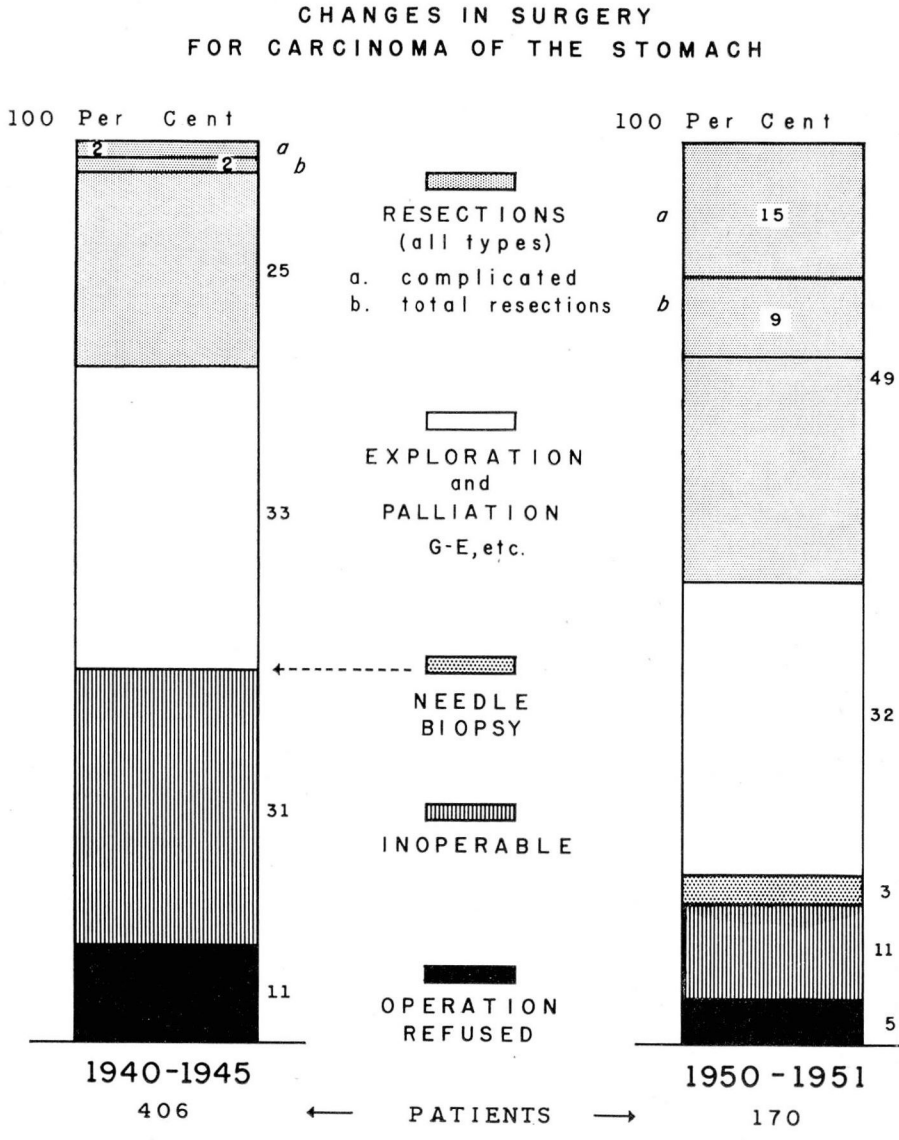

Chart II

centage of patients subjected to exploration or palliative procedures has remained about the same. There is one difference, however; at the present time a biopsy specimen is always taken which was not done in 1940 through 1945. The percentage of patients considered inoperable has decreased from 31 to 11 per cent.

Needle biopsy of the liver and of a Blumer's shelf was not employed in 1940 through 1945, but resulted in a tissue diagnosis in 3 per cent of the patients in 1950 through 1951, without resorting to an exploratory operation. One patient with a Blumer's shelf and three patients with nodular livers had needle biopsies, all of which were positive for carcinoma. The importance of needle biopsy, or exploration to obtain a tissue diagnosis, cannot be overemphasized. There is always the possibility that the lesion may actually be a lymphoblastoma sensitive to roentgen therapy. This has already been stressed, and is aptly illustrated by two other patients. Both of these patients had gastric lesions thought to be carcinoma; one had a supraclavicular node and the other patient had a metastatic lesion in a rib. Biopsy of the supraclavicular node and the rib lesion disclosed that the patients actually had lymphoblastomas sensitive to roentgen therapy. It is quite possible that in earlier years these two patients would have been considered inoperable, that a diagnosis of carcinoma with metastases would have been made without a tissue diagnosis, and they would have been deprived of the years that roentgen therapy may give them.

While this paper is concerned only with carcinoma, actually 7.1 per cent of the malignant gastric lesions seen in 1950 through 1951 were nonepithelial tumors, not carcinoma, and hence are not included in these figures. Many of these mesenchymal tumors are radiosensitive. Without a tissue examination, accurate diagnoses of these patients are not made. They do not receive the benefit of all available therapeutic measures, such as roentgen therapy, nitrogen mustard and similar treatment. Biopsy of a supraclavicular node, an enlarged or nodular liver, a rib metastases, or examination of the ascitic fluid for cancer cells should always be made before the patient is considered hopelessly incurable.

Eleven per cent of the patients in 1940 through 1945 refused operation, while in 1950 through 1951 this number was reduced to 5 per cent. We believe that proper explanation of the problem to the patient can further reduce the number of patients refusing surgery to a minimum. It is unfortunate that so many doctors (at the insistence of relatives of the patient) hide the diagnosis of cancer from the patient. Most patients can accept such a diagnosis and adjust to it more easily than they can adjust to continued worry and doubt. When they are not told the diagnosis, they continue to feel ill, know that they are not well, and may go from one clinic to another, from doctors to faith healers and other quacks. When they know the truth they can accept whatever procedures are required or recommended by the physician or surgeon who understands the problem. It has been our experience that most patients prefer that the doctor be honest with them. Today there should be *no* patient refusing operation for gastric cancer.

We believe that the present surgical attack on gastric cancer can increase the five year survival rate to 15 per cent. Wangensteen[1] has already reported a five year survival rate of 12.2 per cent, and Pack and McNeer[12] have reported 12.3 per cent "cures." Berkson, Walters, Gray and Priestley[13] estimated and predicted a five year survival rate of 14 per cent for all patients with gastric carcinoma who were seen at the Mayo Clinic from 1940 through 1949; their figure is only an estimate since it has not been five years since all of their patients were operated upon, and since they assume that "none of the patients who did not undergo resection are living five years afterward." Such an assumption can be false, since we had two five year survivors without any surgery. We hope to be able to report in the future a five year survival rate of 15 per cent with the present aggressive surgical attack on gastric carcinoma.

Another new factor in the treatment of gastric cancer is the "second-look" operation[1] and operations for recurrent gastric carcinoma.[9] One patient in our group was particularly interesting. In 1941 a subtotal gastric resection was performed for a carcinoma of the antrum. This patient returned in 1949 with an entirely new carcinoma of the cardia of the stomach with extension into the esophagus. In previous years, this patient would have been considered inoperable because of the esophageal extension. However, he was operated upon and a thoraco-abdominal total gastrectomy was done. The patient, seen this year, was completely recovered with no evidence of recurrence. He has been given at least three years, and possibly more, of healthful life by the second operation for a second gastric carcinoma. Our surgeons are not optimistic about "second-look" operations for cancer of the stomach, or operations for recurrent cancer. They try to be as radical as possible with the first operation. It is to be expected, therefore, that recurrences are usually nonresectable and noncurable. Six patients with recurrent carcinomas of the stomach who have been operated upon have not been appreciably helped by the second operation.

Summary

The surgical approach to the problem of gastric cancer in the years 1940 through 1945 has been reviewed and compared with the present surgical attack (1950 through 1951). This comparison demonstrates several changes:

1. Little is left to "clinical judgment" short of exploration.

2. Physical examination rarely determines operability. A fixed mass with apparent extension of the tumor may actually be a resectable lesion.

3. Operability is never determined by roentgen examination of the stomach. What may appear to be an inoperable carcinoma on such study may actually be a mesenchymal tumor or even severe hypertrophic gastritis.

4. Esophageal involvement is not a contraindication to surgery.

5. A tissue diagnosis is desirable in every case. A suspected carcinoma with metastases such as a supraclavicular node or a rib lesion may actually be a lymphoblastoma sensitive to roentgen therapy. A hard nodular liver may be a

cirrhotic liver, and a Blumer's shelf may be lipogranuloma, chronic inflammatory pelvic mass and in the female an incarcerated, retroverted uterus.

6. The operability and resectability rates have increased, possibly resulting in more potential cures, and we believe will increase the number of five year survivors.

7. Extension of the disease to neighboring organs and lymph nodes is not necessarily a contraindication to resection. Some of these patients, with adequate resections, have been five year survivors.

8. More total gastric resections and more complicated resections with removal of adjacent organs are being performed. This should result in a greater chance for five year survival in a greater number of patients.

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