

Acute Gastroduodenal Perforation

An Analysis of 496 Patients Treated Surgically

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PREVIOUS REPORTS from Baylor University College of Medicine have indicated that immediate subtotal gastrectomy may be applied to the management of acute gastroduodenal perforation in properly selected cases with an operative mortality no greater than that following other modes of therapy.^{1,4} This definitive approach to the management of this serious complication of ulcer effectively interrupts the progress of the disease and prevents future complications. This report encompasses ten years of experience with resective therapy.

CLINICAL MATERIAL

The current study consists of an analysis of 496 patients treated for acute gastroduodenal perforation in the Baylor Affiliated Hospitals during an 11-year period ended December, 1961. Four hundred and thirty-three patients had duodenal ulcers, 52 had gastric ulcers, seven had marginal ulcers and four had cancer. Free perforation into the peritoneal cavity had occurred in all, and operation was undertaken in emergency. The interval between perforation and the beginning of surgical management varied from two hours to five days. Operation was performed as soon after diagnosis as the condition of the patient permitted. Sufficient time, however, was spent in preoperative preparation to replenish fluid and electrolyte depletion, to begin antibiotic therapy and to treat exigent medical conditions such as congestive heart failure or diabetic acidosis when indicated.

In the early portion of the study, before January, 1952, simple closure was used as the treatment of choice, but for the last ten years of the study gastrectomy was used as the treatment of choice unless contraindicated. Contraindications to immediate gastrectomy were (1) illness so critical that in the opinion of the surgeon the patient ought not to be subjected to a prolonged operative procedure and (2) the presence of technical problems which would make resection unduly hazardous.

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• Of 496 patients treated surgically for acute gastroduodenal perforation, 144 were treated by simple closure, 317 by immediate subtotal gastrectomy, 22 by immediate hemigastrectomy and vagotomy and 13 by delayed subtotal gastrectomy. In our most recent experience with 225 consecutive resections, the postoperative mortality rate was no greater than that observed following elective subtotal gastrectomy for other complications of ulcer disease. A review of the late results indicated that the response of patients with this complication is similar to that of patients with other complications of ulcer disease treated in the same manner. It was concluded that a definitive surgical procedure should be employed as the operation of choice in properly selected patients.

No arbitrary rule was established as to what lapse of time after perforation might be taken as contraindication to resection, and some patients successfully underwent resection three to five days after perforation. In general, however, patients in whom perforation had been present for a day or more were seriously ill and were more likely to have intra-abdominal abscesses than those with perforation for a shorter period. Resection was not performed if there was pus within the peritoneal cavity. Consequently, in the majority of patients partial gastrectomy was done within 24 hours after perforation.

Three different types of resection were used in the study. In most cases immediate subtotal gastrectomy was carried out, using gastroduodenostomy or gastrojejunostomy for reconstruction of gastrointestinal continuity. In the last two years of the study, hemigastrectomy and vagotomy were used occasionally as a substitute for subtotal gastrectomy. Early in the study, delayed subtotal gastrectomy was used also. This consisted of treatment by simple closure followed by subtotal resection within two to four weeks after perforation without attempting to determine whether or not the patient might have additional symptoms. Only 13 patients were treated in this manner; the procedure was abandoned because of the high incidence of complications associated with the two operative procedures.

TABLE 1.—A Comparison of Treatment of Acute Gastroduodenal Perforation in Three Periods

Treatment	October, 1950 to December, 1951		January, 1952 to October, 1954		November, 1954 to December, 1961		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Simple closure.....	48	72.7	22	17.0	74	24.6	144	29.0
Immediate subtotal gastrectomy.....	15	22.7	97	75.2	205	68.1	317	63.9
Hemigastrectomy and vagotomy.....	0	0.0	0	0.0	22	7.3	22	4.4
Delayed subtotal gastrectomy.....	3	4.6	10	7.8	0	0.0	13	2.7
Total.....	66	100.0	129	100.0	301	100.0	496	100.0

RESULTS

To analyze results we divided the study into three periods. During the first period, from October, 1950, through December, 1951, simple closure was used as the treatment of choice, and subtotal gastrectomy was used only in selected patients—for example, in patients with combined perforation and hemorrhage. The second period from January, 1952, through October, 1954, represented the early phase of the use of gastrectomy as the treatment of choice, while the most recent period, ended December 31, 1961, represented continuing experience with this program (Table 1). At present, some 75 per cent of patients who are treated for acute perforation are considered candidates for resection.

Mortality and Complications: There was little variation in the mortality rate during the three periods (Chart 1). More patients died of peritonitis than of any other single cause, but all deaths from generalized peritonitis occurred before 1954. In 70 per cent of patients, death was due to factors other than intra-abdominal complications of the perforation. Most of those who died were elderly and debilitated with severe associated diseases. In the last five years of the period, for example, only two deaths were in patients less than 50 years of age. In one of these, aged 33, cardiac arrest developed on the operating table during subtotal gastrectomy. The patient was resuscitated but there was evidence of permanent cerebral damage and death occurred 20 days after operation. A second patient, aged 48, who had simple closure, died of renal failure and wound dehiscence 20 days after operation. The ages of the remaining patients who died during this period varied from 50 to 85 years.

A comparison of the mortality rates according to the procedure performed revealed that after we began using immediate subtotal gastrectomy as the treatment of choice, the mortality rate in patients treated with simple closure rose while the mortality rate associated with subtotal gastrectomy fell (Chart 2). In recent years, including patients treated both by standard subtotal gastrectomy and by hemigastrectomy and vagotomy, the mortality rate following resection has been as low as that

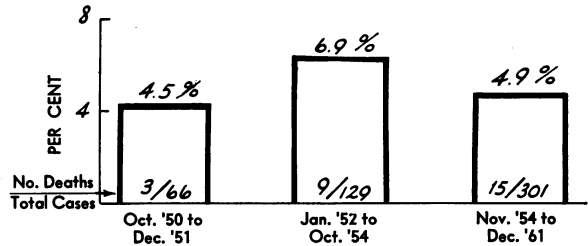
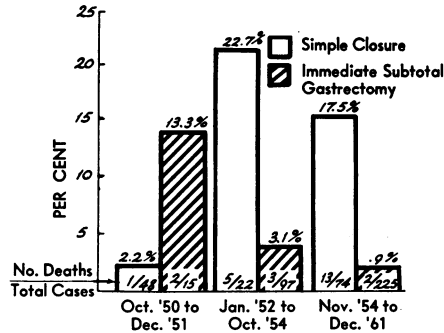


Chart 1.—Treatment of acute gastroduodenal perforation. A comparison of total operative mortality rates in three periods.



*Chart 2.—Treatment of acute gastroduodenal perforation. A comparison of mortality rates in three periods according to type of operation. In the third period subtotal gastrectomy and hemigastrectomy and vagotomy are listed together under "immediate subtotal gastrectomy."

observed following elective subtotal gastrectomy (0.9 per cent). On the other hand, the mortality rate following simple closure has remained quite high, reflecting the fact that this form of therapy was used primarily in patients who were poor operative risks. It is interesting, however, that in the over-all comparison of the various surgical procedures utilized, subtotal gastrectomy was done in 317 patients and the mortality rate associated with that operation was lower than that of any of the other methods. The experience with hemigastrectomy and vagotomy is as yet too small to reflect an accurate mortality rate, but it is to be anticipated that the mortality rate will be essentially the same as that following standard subtotal gastrectomy as our experience increases (Chart 3).

As in other studies, the mortality following

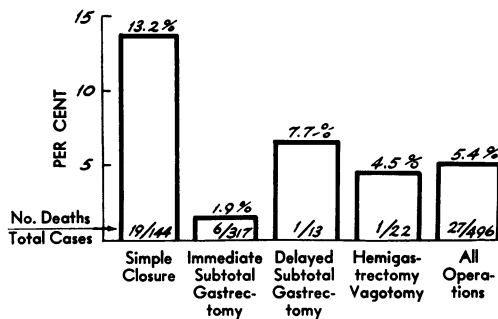


Chart 3.—Treatment of acute gastroduodenal perforation. Mortality rates according to procedure.

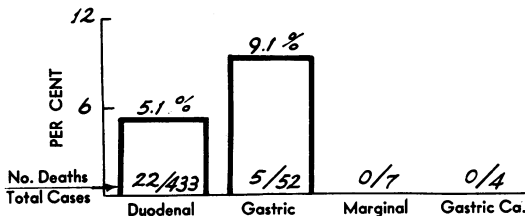


Chart 4.—Treatment of acute gastroduodenal perforation. Mortality according to location.

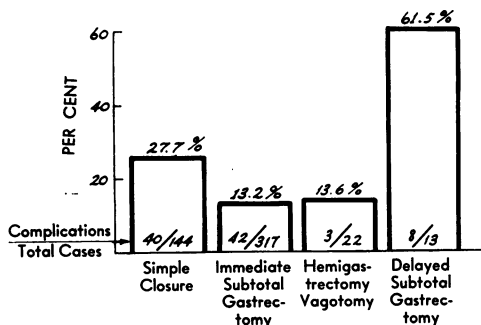


Chart 5.—Treatment of acute gastroduodenal perforation. Comparison of complication rates according to procedure.

treatment of perforated gastric ulcers was higher than that following treatment of perforated duodenal ulcers (Chart 4).

The incidence of complications remained essentially unchanged from previous reports, resective therapy being attended by the lowest rate (Chart 5). This is partly a reflection of the choice of patients, but it is noteworthy that the complication rate was lower than that following treatment of other complications of ulcer disease. Particularly significant is the absence of any leakage from the duodenal stump in the past eight years.

LATE RESULTS

Late results were studied only in the patients treated at the Veterans Administration Hospital. Of 137 consecutive patients treated by subtotal gastrec-

TABLE 2.—Incidence of Marginal Ulceration According to Location of Ulcer and to Procedure

Diagnosis and Procedure	Total Patients Treated	Patients with Marginal Ulcer	
		Number	Per Cent
Duodenal ulcer	98	4	4.1
Billroth I	23	4	17.4
Billroth II	75	0	0.0
Gastric ulcer	6	0	0.0
Marginal ulcer	2	1	50.0

tomy, 109 (79.5 per cent) were observed for periods ranging from four months to eight years. Of three who had carcinoma, two died in the follow-up period and one was still living more than a year after operation. The remaining 106 were treated for benign gastroduodenal ulceration, 98 having duodenal ulcers, six gastric ulcers and two marginal ulcers.

Several years ago gastroduodenostomy was used as the method of reconstituting gastrointestinal continuity following resection for duodenal ulcer, but in our experience this procedure was followed with so high an incidence of marginal ulceration that it was abandoned. Of 23 patients with duodenal ulcers in the current series who were treated in this manner, four had recurrent ulceration and ulceration was suspected in a fifth. This proportion is similar to that observed following treatment of other complications of duodenal ulcer with this procedure.² On the other hand, there were no cases of proved marginal ulcer among the 75 patients with duodenal ulcer treated by Billroth II procedure (Table 2). One patient had pain consistent with recurrent ulcer but the diagnosis was not proved. This incidence of marginal ulceration is less than that seen after treatment of other complications of duodenal ulcer with this technique, where, in our experience, the incidence is approximately 3.5 per cent.

In the current series of perforated ulcers there were no recurrences following treatment of gastric ulcers regardless of the type of resection employed. There was one recurrence following treatment of marginal ulcer. The patient subsequently was proven to have the Zollinger-Ellison syndrome and was treated by re-resection as well as resection of the pancreatic neoplasm. There was no recurrence of ulceration in the five years the patient was observed after the operation.

Approximately 25 per cent of the 106 followed patients treated for benign disease experienced the dumping syndrome. In only one patient, however, were symptoms severe while in an additional seven they were moderate. In most of these patients the condition was satisfactorily controlled by conservative measures. Two patients had chronic afferent loop obstruction. In both (as previously reported³) operative correction of the obstruction relieved the symptoms. Seven patients (6.6 per cent) were clas-

TABLE 3.—Incidence of Postgastrectomy Syndromes in Series of 106 Patients

Syndrome	No. Patients	Per Cent of Series
Dumping	26	24.5
Mild	18	17.0
Moderate	7	6.6
Severe	1	.9
Afferent loop obstruction	2	1.8
Psychologic	7	6.6

TABLE 4.—Classification of Results Following Treatment of 106 Patients with Benign Ulceration

Result	No. of Patients	Per Cent
Excellent	63	59.4
Good	30	28.3
Poor	13	12.3
Total	106	100.0

sified as having symptoms referable to psychologic cause (Table 3). This incidence of psychologic symptoms is higher than that noted in other studies of gastric resection, but at present no particular significance can be attached to this observation.

The over-all classification of results does not vary significantly from that reported by us in an earlier study or from that commonly observed following the utilization of subtotal gastrectomy for other complications of duodenal ulcer; namely, almost 88 per cent had excellent or good results and only 12.3 per cent had poor results (Table 4). In five of these patients, the result was classified as poor because of demonstration or suspicion of marginal ulcer. In others, the poor result was related to postgastrectomy sequelae or to psychologic problems which interfered with the patient's normal daily activities.

Our experience with hemigastrectomy and vagotomy was too small and too recent for follow-up studies.

DISCUSSION

In the early phases of investigation of subtotal gastrectomy in the treatment of this disease, the history of previous ulcer disease was not considered a determining factor in deciding which procedure should be employed. More recently, however, there has been a tendency among some of the physicians participating in the study to reserve definitive sur-

gical treatment for those patients with a significant history of ulcer disease in the past. All patients treated by subtotal gastrectomy without previous history of ulcer disease had a good or an excellent result; however, the number of patients in this category was not sufficient to permit definite conclusions concerning the superiority of one mode of therapy over the other. On the other hand, the evidence now available should leave no question concerning the value of a definitive surgical procedure when perforation represents a complication of chronic ulcer disease: the majority of such patients will continue to have symptoms following simple closure, whereas in properly selected patients termination to the ulcer problem can be safely brought about by immediate subtotal gastrectomy.

Currently we favor hemigastrectomy and vagotomy as the treatment of choice for complications of duodenal ulcer. We were reluctant to use this procedure in the presence of peritonitis, but reports from other centers which indicate that mediastinitis has not been a problem following vagotomy and pyloroplasty have encouraged us to institute an evaluation of hemigastrectomy and vagotomy.⁵ Only 22 patients have been treated so far, but to date the complication rate is no different from that after standard subtotal gastrectomy. Additional experience will be necessary for valid comparison of the results of this form of therapy with that following standard subtotal gastrectomy, but the results obtained in treatment of other complications of ulcer disease suggest that it may be somewhat superior.

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