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Treatment of Duodenal Ulcer by Conservative Gastric Resection with Partial Vagotomy

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THE recent introduction by Dragstedt and his associates of complete double vagotomy in the treatment of peptic ulcer has been received with considerable enthusiasm. Although this is a worthy contribution, a word of caution is probably in order. Granted that complete vagotomy has so far seemed to effect a clinical cure in most cases of duodenal ulcer, there are certain theoretical and practical objections to the use of this procedure.

Theoretically, the vagus nerves are among the most important in the body. They constitute the parasympathetic nerve supply of a large portion of the abdominal viscera, including the stomach. So far as the stomach is concerned, a variable degree of cardiospasm, pylorospasm, and gastric atony should result from the complete severance of the vagus nerve fibers. Furthermore, vagus section alone does not attack the so-called hormonal factor in the secretion of gastric acid, which is proven by the response of vagotomized patients to histamine. Some observers have stated that this factor is unimportant. This viewpoint, however, is debatable. Lahey and others have effected a cure in certain cases of stomal ulcer following gastric resection, where it was necessary at the initial opera-

tion to leave a small portion of the pyloric antrum, by subsequently reoperating upon the patient and removing this portion of the stomach.

From a practical standpoint, disturbance of motility of the stomach has seemed to be the most important objection to the procedure. Most surgeons advocating vagotomy have stated that gastric retention following vagotomy is of a transient nature. In the experience of certain others, this has not consistently been the case. McIntyre, Kipen, and the writer, on the joint graduate teaching service of the University of Southern California, the College of Medical Evangelists, and the University of California at Los Angeles, have recently started to recheck vagotomized patients who were operated on approximately a year ago at the Veterans Hospital at Sawtelle. So far, ten patients have been called back for reexamination. The studies made on these patients include roentgenograms of the stomach following a standard barium meal. This has been completed on the ten patients. In five cases in which vagotomy alone was performed the emptying time of the stomach in one was normal. In the other four there was a 24-hour retention of barium of from 30 per cent to 85 per cent. One patient with 70 per cent retention had two small gastric ulcers demonstrated by roentgenographic and gastro-

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scopic examination. In the four cases vagotomy seems to have been complete, as indicated by the insulin tests made at this time. In all these cases the stomach had emptied in four hours or less before vagotomy.

In the remaining five cases, one patient, ten months after vagotomy for stomal ulcer had been done following gastric resection, showed some retention of barium at the end of ten hours, although the stomach was practically empty in six hours. In four cases supplementary gastroenterostomy had been done in conjunction with vagotomy, and in two of these the stomach was practically empty of barium in six hours while in the other two there was 75 per cent retention at the end of that time. All these patients had well placed posterior gastroenterostomies.

There is a current trend toward combining vagotomy with gastroenterostomy. There seem to be at least two objections to this procedure. In the first place, it is difficult to evaluate the results of a single procedure, as vagotomy, when combined with another procedure such as gastroenterostomy, particularly when this latter procedure alone appeared to afford excellent results in the treatment of duodenal ulcer for a great period of time. Many patients having gastroenterostomy seemed clinically cured for many years until stomal ulcers developed. The second theoretical objection to gastroenterostomy is that making a new opening in the stomach does not attack the basic cause of retention, namely, atony. In the studies at Sawtelle pylorospasm, cardiospasm, and diarrhea have not been important sequelae of vagotomy from a practical point of view. The investigations at the Veterans Hospital will include the recheck with barium of the emptying time of the stomach in all cases in which vagotomy, combined with gastroenterostomy, was done about a year previously. When the study is completed this year, it will be reported.

Complications such as hemorrhage, perforation, and complete obstruction from recurrent ulcers following vagotomy have resulted in death in a few cases, although not in sufficient number to condemn vagotomy.

Gastric resection, with the removal of three-fifths of the stomach and the ulcer-bearing portion of the duodenum, has stood the test of time probably as well as or better than any of the surgical procedures heretofore used in the treatment of duodenal ulcer. Although the results, on the whole, have been good, unpleasant complications, including stomal ulcer, occur. Fatalities sometimes result from the blowing out of the duodenal stumps. Experimental data apparently applicable to this procedure are somewhat confusing. James Watson, working in the laboratory of Frank Mann at the Institute of Experimental Medicine at Rochester, Minnesota, performed fundusectomies on dogs which included the removal of most of the acid-secreting cells of the stomach. Reductions in both free and total hydrochloric acid were noted immediately after operation on dogs in which extensive resection was done. In subsequent operations 15 to 18 weeks later, the acid curve was elevated and in six months reached a point practically as high as it

was preoperatively. This work suggests that the removal of the acid-bearing glands of the stomach will not eradicate the acid factor in the production of ulcer. On the other hand, Priestley's work on animals in the same institution implies that removal of the hormonal factor in the pyloric portion of the stomach alone is not of major importance in the cure of ulcer. However, as mentioned before, stomal ulcers following exclusion operations where a portion of the pyloric antrum has been left intact have been cured by subsequently removing this remaining portion. This clinical observation is difficult to dispute.

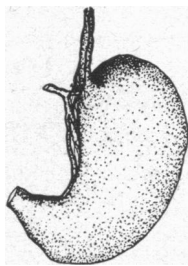


Figure 1

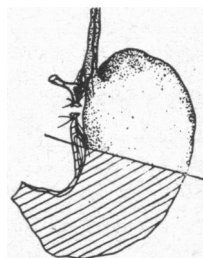


Figure 2

In an attempt to improve the results of radical gastric resection and to make the operation safer so far as leakage from the duodenal stump is concerned, Stevens, Sloan, and Danglade, a few years ago, began to utilize the combined procedures of conservative gastric resection and partial vagotomy. The purpose of this procedure is to attack both the hormonal and nervous phase of the secretion of gastric acid without the removal of the duodenal ulcer itself. It was believed unwise because of the importance of the vagus nerves, considering parasympathetic distribution, to divide both nerves completely. To use a simple hypothesis: If an electric light bulb is likely to burn out because of too strong a current, is it better to cut off the current entirely and substitute candlelight or to reduce the electric current to the point that the bulb gives a satisfactory light without burning out? The answer would seem to apply to complete and partial vagotomy.

Clinical and experimental studies, however, indicate that partial vagotomy alone will not effect a cure of duodenal ulcer. Granted that this is true, will a combination of this procedure and removal of the gastric hormonal element result in clinical cure of this lesion?

The answer may be supplied at some later date by follow-up studies of a series of patients which the author has treated by this method. In this series the vagus nerve fibers accumulating on the lesser curvature of the stomach were included in a mass ligation and division of the coronary artery high on the lesser curvature. (According to the anatomical dissections of Dragstedt, this should include at least 75 per cent of the fibers of both vagus nerves. (Figures 1 and 2) The procedure is simple and is not time-consuming.

Approximately one-half of the stomach, including the pyloric portion, was removed rather than the con-

TABLE 1.—Results Following Complete Vagotomy

Case	Pre-op Free HCL Clinical Units	Post-op Free HCL Clinical Units
1	24	12
2	44	15
3	40	0
4	60	20
5	85	5
6	30	20
7	35	20
8	47	0
9	50	0
10	25	5
Average	44%	9.7%

TABLE 2.—Results Following Combined Partial Vagotomy and Conservative Gastric Resection

Case	Pre-op Free HCL Clinical Units	Post-op Free HCL Clinical Units
1	45	0
2	38	0
3	60	0
4	68	0
5	53	0
6	36	0
7	14	6
8	32	8
9	32	12
10	60	0
Average	43.8%	2.6%

ventional three-fifths of the stomach. (Since it is difficult, at best, for the surgeon to determine exactly what proportion of the stomach he is removing, if doubt exists, a larger rather than a smaller amount should be removed.) Experience has shown that removal of less than one-half of the stomach results in the frequent occurrence of stomal ulcer. Removal of half of the stomach eliminates part of the acid glands and a large part of the chemical phase of the secretion of gastric acid. The so-called hormonal factor is not entirely eliminated, however, as has been indicated by postoperative studies with histamine. The postoperative reduction of gastric acid, following this relatively conservative combination of procedures, is more consistent than that following complete double vagotomy alone. This is illustrated by Charts 1 and 2. The data on the ten cases shown in Chart 2 are typical of the series as a whole. Insulin tests which have been made recently showed a reduction of free hydrochloric acid from an average of 69 per cent preoperatively to an average of 17 per cent postoperatively. This suggests that partial vagotomy as executed in this series is effective.

As previously stated by Stevens, Sloan and Danglade, it is not necessary to include removal of the duodenal ulcer with gastric resection to cure the lesion. On the other hand, the poor results with ex-

clusion operations show that it is necessary to remove all of the pars pylorica. In our series the indications for operation were largely obstruction and repeated hemorrhage. Approximately 40 per cent of the cases were in the latter group. There has been no recurrence to date, and in none of the cases was the ulcer removed. In our series the stomach was divided at or just below the gastroduodenal junction. Rather than dissect the posterior wall of the duodenum, which heals poorly, from the head of the pancreas, the capsule of the pancreas, which heals rapidly, was used as a reinforcing layer in the closure of the duodenal stump. Some surgeons have objected to this method because of what they consider likely morbidity from leakage of the duodenal stump even though they grant it is not necessary to remove the ulcer. In our series, however, there has not been a single incidence of leakage.

It is planned to report, in detail, the postoperative results in this series of cases five years after the one-hundredth operation. To those using this procedure, results so far seem better than with other procedures they have tried. This is merely a preliminary report, however, and no deductions are justified at this time. It is hoped that those so inclined will use the method of conservative gastric resection and partial vagotomy, as described herein as a check on this study.

Probably most surgeons whose results have been good with conventional gastric resection should continue to utilize the procedure until time has proven other methods to be superior. This excepts the cases with stomal ulcer following high gastric resection for which complete vagotomy is probably the treatment of choice. By the same token, it seems reasonable that those interested and experienced in the problem of vagotomy should continue with this important study. As Berne has aptly stated, the present status of vagotomy is that of an uncompleted experiment.

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