RESECTION OF THE PROXIMAL DUODENUM AND PYLORIC SPHINCTER FOR MULTIPLE DUODENAL ULCERS

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On July 7, 1924, during the performance of a Finney pyloroplasty for duodenal ulcer, a large, indurated posterior ulcer was found in addition to the calloused ulcer upon the anterior wall. It seemed futile to remove one ulcer only to leave another, and for this reason the duodenum was completely divided and about an inch and a half of the proximal end resected. This procedure removed both the anterior and posterior ulcers. In order to insure patency of the pyloric opening, about an inch of the stomach, including the entire pyloric ring, was removed with the ulcer-bearing duodenum. An end-to-end anastomosis completed the operation. This patient, a nurse, twenty-seven years of age, made an uneventful recovery and has had no further abdominal distress to date.

It was not until 1927 that we made extensive use of the pyloroplasty and consequently did not again have occasion to perform a similar resection of the duodenum until then. Beginning in 1927, whenever a suitable case was found, the method of pyloroplasty as described by Judd, was used in preference to any other type of resection for duodenal ulcer. When a single ulcer upon the anterior wall of the duodenum is encountered, the Judd pyloroplasty is ideal. All of our cases have made smooth recoveries and are, so far as we have been able to ascertain, cured. As our experience with the operation increased, however, we were forcibly impressed by the large number of multiple duodenal ulcers encountered. Judd [1] has reported the finding of multiple ulcers in but 0.71 per cent. of 4901 cases of duodenal ulcer in which operation was performed. These figures are based upon work at the Mayo Clinic between January 1, 1906, and January 1, 1921, or during a period in which little plastic surgery upon the duodenum was done. Consequently, a view of the lumen of the duodenum was not obtained in the great majority of these cases and undoubtedly a large number of posterior ulcers were missed. Fluoroscopy is unreliable in the diagnosis of multiple lesions, and negative röntgenological findings do not rule them out. Indeed, shallow posterior lesions by themselves may not give even the cap deformity, upon which the diagnosis of ulcer is most often made. The point we are trying to emphasize is simply that in all probability 0.71 per cent. is much too low for the actual occurrence of multiple lesions. In our own cases, though few in number when compared to these, two or more ulcers were found in a much higher percentage.

Of the fifty consecutive cases brought to the surgery for ulcer (gastric ulcer omitted) in 1927 and 1928, the operations performed were as follows:

Gastro-enterostomy	32– 64
Simple closure of acute perforation	2– 4
Polya resection for gastrojejunal ulcer	2– 4
Judd pyloroplasty	10– 20
Partial duodenectomy	4– 8
Total	50–100

In thirty-six cases the duodenum was not opened and but one ulcer was diagnosed. In the fourteen cases in which a view of the lumen was obtained, on the other hand, contact ulcers on the posterior wall were found in seven cases, or in 50 per cent. In two cases many lesions were present, five distinct ulcers in one case, and four in another. (Fig. 1.)

Posterior lesions in the first four cases were disregarded, the anterior ulcer being removed with a section of the pyloric ring in the manner described by Judd. These patients did not do as well as usual. One case especially had persistent distress for months following the operation, and even today any slight indiscretion in diet will bring about a recurrence of pain.

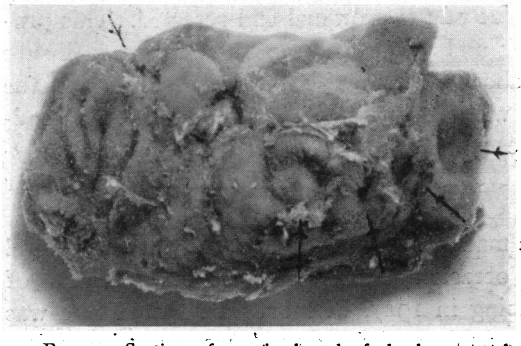

FIG. 1.—Section of proximal end of duodenum and pyloric ring removed by partial duodenectomy. Arrows point to the five indurated ulcers found in this specimen.

Because of this unsatisfactory experience we determined to disregard posterior ulcers no longer. A complete resection of the proximal end of the first portion of the duodenum, including the ulcerative lesions, and the pyloric ring of the stomach with end-to-end anastomosis is now done when possible in all cases of multiple duodenal ulcers. (Figs. 2, 3, 4.) This operation has been performed by us five times with complete and permanent cure in every case except one. Convalescence is smooth and the post-operative reaction slight compared with gastro-enterostomy, gastric resections, and other surgical procedures for the cure of lesions of the duodenum. There is apparently no more post-operative risk or shock than in the Judd pyloroplasty.

One of our cases died on the third post-operative day following the intravenous injection of faulty glucose solution by an inexperienced intern. Until the time of this unfortunate accident the patient, a man sixty-five years of age, with four indurated ulcers in the proximal inch and a half of the duodenum, had shown splendid progress. After the first twelve hours there had been no vomiting and little discomfort. As is our custom, we had given him water in small quantities for the first time on the morning of the third day, intravenous glucose being routinely employed in stomach cases the first three days. The glucose was given at 11:30 A.M. About twenty minutes later the patient had a severe chill and became very cyanosed. He soon lost consciousness. Because of the extreme anoxemia he was placed in the pneumonia tent

and seemed to rally somewhat, but expired at 7 A.M. the following morning. Autopsy revealed an ante-mortem clot in the right pulmonary artery. The anastomosis between the stomach and duodenum was in perfect condition and undoubtedly had it not been for this tragic mishap the patient would have had an excellent result.

We think this operation solves a vexing problem, and, when indicated, is indispensable. Horsley [2] for some years has employed his pyloroplasty when-

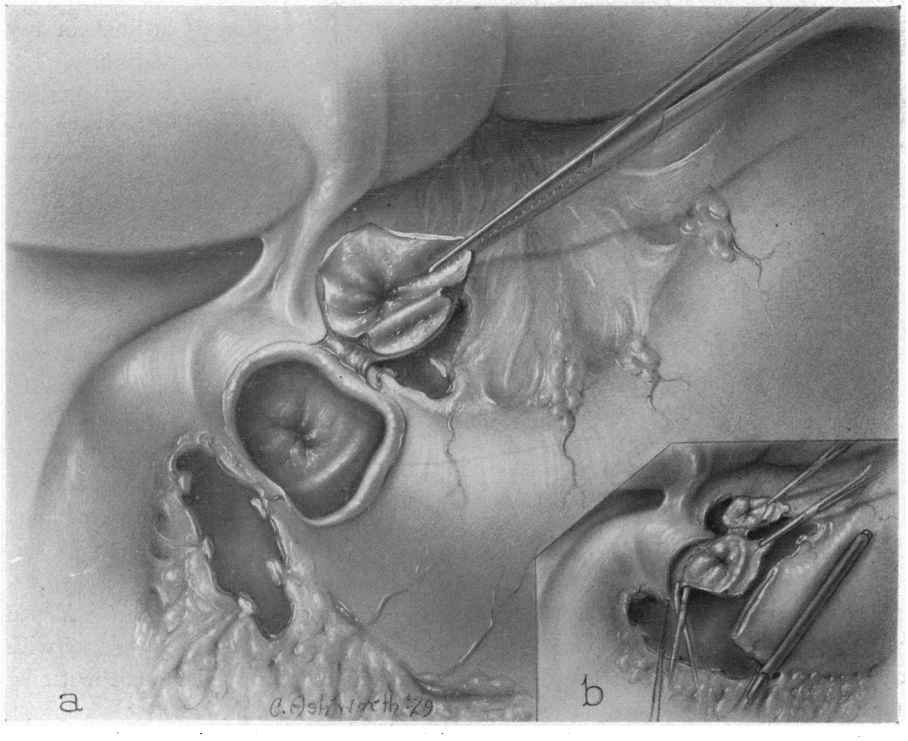

FIG. 2.—(*a*) Judd pyloroplasty partially completed showing anterior and posterior ulcers. (*b*) Method of resecting posterior ulcer—first step of partial duodenectomy, excision of posterior ulcer and pyloric ring.

ever possible in dealing with duodenal ulcerations, and during this time has been confronted repeatedly with the question of how to deal with posterior and contact ulcers. On two occasions he attempted to resect the posterior ulcer through the pyloroplasty opening on the anterior wall. Sutures were placed in the posterior wall to draw the edges together to close the space made by removal of the ulcer and to control hæmorrhage. Because of the small opening through which this work was done he was unable to control bleeding and these two cases ultimately bled to death. This very disastrous experience compelled Horsley to abandon this method of attack on posterior ulcers.

Many writers, especially the Europeans, during the last few years are advocating extensive gastric resection for duodenal ulcer. We feel that this is not a logical treatment of this problem. In the first place, partial gastric

resection in the best hands carries a mortality rate of from 6 to 10 per cent. Secondly, resection of the stomach as ordinarily performed does not remove the duodenal lesions, but even if, as has been recently advocated, a portion of the proximal duodenum is removed in a partial gastrectomy, we maintain this method as a primary operation to be unnecessarily extensive. Lastly, gastrojejunal ulceration, when it does develop following pylorectomy, is a far more appalling condition with which to deal than a recurrence of a duodenal ulcer after resection of an inch or two of the duodenum.

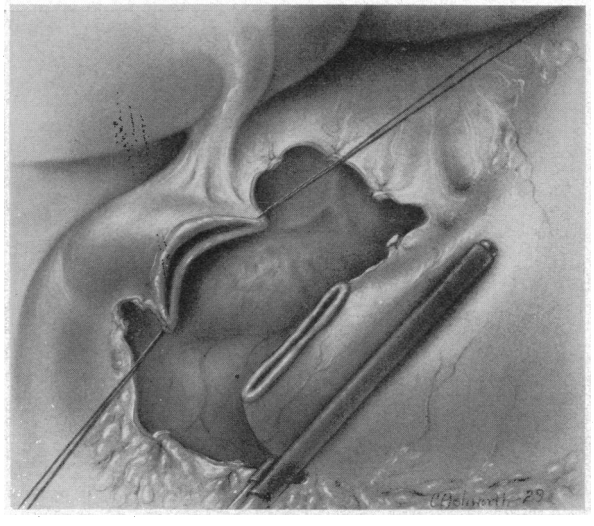

FIG. 3.—Second step of partial duodenectomy. Note that the semicircular incision widens the duodenum sufficiently to permit direct anastomosis to the stomach.

There is no question in our minds as to the preferability of pyloroplasty to gastro-enterostomy in selected cases. Pyloroplasty in our experience is less dangerous, is followed by fewer recurrences, and the immediate post-operative reaction is infinitely milder. From the literature it is impossible to accurately estimate the percentage of recurrences to be expected following pyloroplasty. Reports by well-known surgeons vary from 2 to 13 per cent.[3, 4] When present, recurrences after pyloroplasty may still be conservatively treated with a gastro-enterostomy but gastrojejunal ulcer usually must be dealt with by extensive gastric resection.

Gastro-enterostomy may be followed by other serious complications. The vicious circle dreaded since the first gastro-enterostomy by Wolfler, in 1881, is even today not a thing of the past. Occasionally, in spite of correct operative technic and painstaking care, the distal loop will become kinked and regurgitant vomiting will ensue, necessitating entero-enterostomy.

The adverse views which R. Lewisohn[5] of Mount Sinai expressed as to this operation by his report of 34 per cent. of gastrojejunal ulcers has failed in its apparent intent to frighten surgeons from gastro-enterostomy entirely. Indeed, many papers written since by no less authorities than Balfour,[6] Judd,[1] Moynihan,[7] and other master surgeons expressly refute Lewisohn's statistics. Nearly all are willing to admit, however, that gastrojejunal ulcer is of more frequent occurrence than the heretofore accepted 2 per cent. In the large clinics where the operation is performed by expert surgeons under the most favorable circumstances, gastrojejunal ulcers occur in 3 to 5 per cent. of the reported cases. Throughout the

country this percentage is undoubtedly much higher. Possibly the conservative estimate of Davis [8] (approximately 8 per cent.) is more nearly correct than the prohibitive figure of Lewisohn. At all events, gastrojejunal ulcer occurs with sufficient frequency and creates, when present, such a difficult problem, that for the avoidance of this complication alone surgeons will gladly accept any practical substitute for gastro-enterostomy.

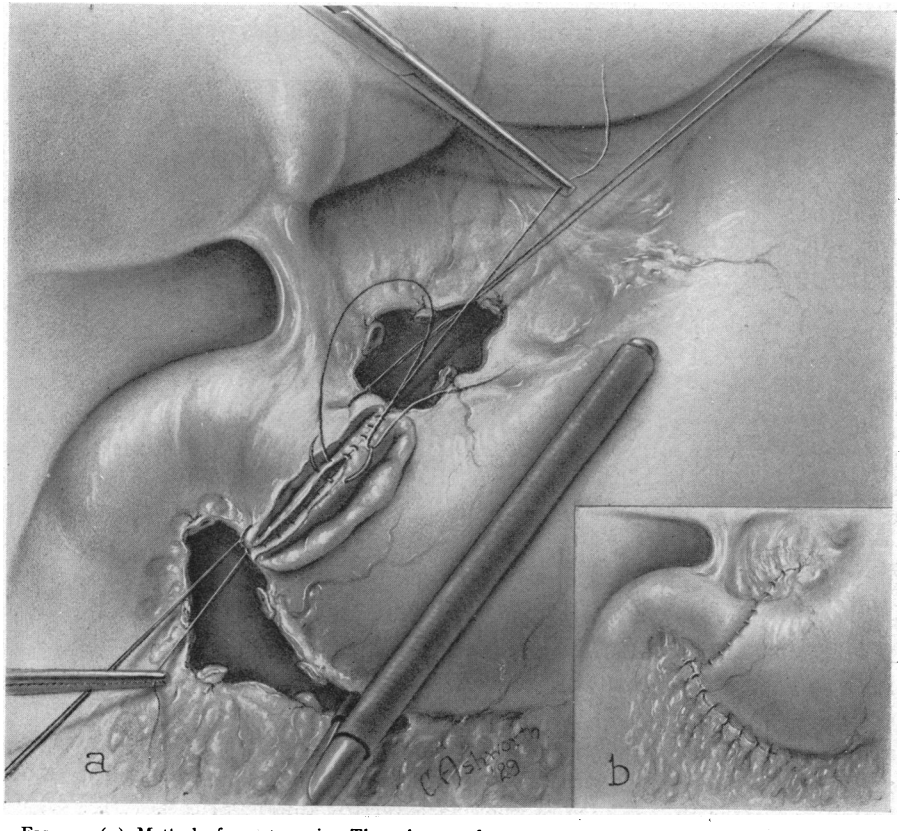

FIG. 4.—(*a*) Method of anastomosis. Three layers of sutures were used. (*b*) Operation completed.

As is readily seen, all these points favor pyloroplasty and operators in this country, following the leadership of Finney,[9] Judd,[1] Horsley,[2] and others, are using this operation instead of gastro-enterostomy whenever possible. This is as it should be. We use the plastic operation for nearly every duodenal ulcer in which the duodenum is sufficiently loose to permit suture without tension. Where multiple or posterior ulcers are found, the entire ulcer-bearing area, usually the first inch of the duodenum and the pyloric sphincter, is resected. Any duodenum mobile enough to permit easy pyloroplasty can be resected in this manner without great difficulty. Gastro-enterostomy is still preferred for old stenosing ulcers, for ulcers acutely inflamed where the associated œdema

of the duodenum would make suturing unsafe, and for ulcers occurring in a relatively immobile duodenum.

Judd,[1] in writing upon the treatment of duodenal ulcers, makes the following statements: "Gastro-enterostomy results in healing, although not in every case. I do not believe the present wave of enthusiasm for resecting the stomach for duodenal ulcer will last very long. The best type of operation for duodenal ulcer is one that removes the ulcer and places the pyloric sphincter at rest."

When posterior ulcers are absent, the Judd pyloroplasty fulfills these requirements; when present, however, a partial duodenectomy, as described, must be done to satisfy these demands.

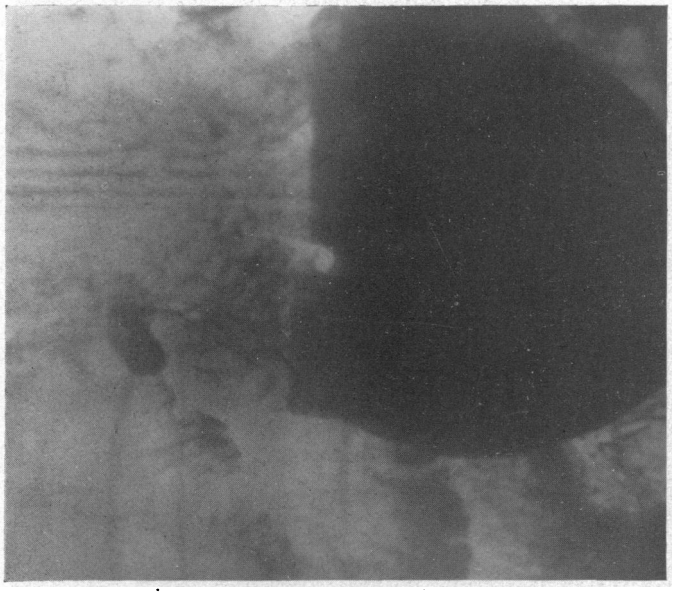

FIG. 5.—Röntgenogram of stomach and duodenum prior to operation. Note the poorly-filled, deformed duodenal cap.

What the ultimate outcome of this operation will be we cannot now state. We have only four cases that have been observed long enough to warrant the drawing of conclusions. The first case we did, four and a half years ago, as has been stated, remains well to date. Rescreening these cases after a period of years reveals a practically normal condition. (Fig. 7.) The chief difference from the unoperated patient is the absence of the characteristic duodenal cap. (Fig. 5.) In spite of the complete removal of the pyloric sphincter by the operation, röntgenologically a mild sphincteric action is still observed. (Fig. 6.) Possibly the circular muscle fibres in this region may develop after a time into a true sphincter after the pyloric ring has been removed. Whatever the explanation of this phenomenon, spasm in every case is lacking and barium can readily be pushed from the stomach into the duodenum without force. For this reason we believe that if the muscles at the end of the stomach have become somewhat sphincteric in action, this is not pronounced enough to be detrimental.

We realize the scope of this operation is very limited, but it does provide a graceful exit from the embarrassing situation one faces when unsuspected contact ulcers are encountered in the course of the performance of a pyloroplasty. It has, therefore, a very definite place in surgery of the duodenum, but

in spite of this fact there is very little reference to partial duodenectomy in the literature.

Balfour,[10, 11] in 1927, and again in January of this year, reported a practically identical operation except that he removes rather more of the stomach than we do. His method, in which seven to eight centimetres of the stomach is removed, is essentially a Billroth No. 1, which includes the ulcer-bearing

FIG. 6.—Two months after partial duodenectomy. A distinct sphincteric action in pyloric region of stomach may be observed, despite removal of the pyloric ring at operation. Rugæ are still seen in the first portion of the duodenum, although a tendency to cap formation has already become manifest.

duodenum. It is our opinion that it is unnecessary to resect the stomach where the chief lesion is duodenal, except to remove the pyloric ring, and in this only does our method of resection differ from his.

Balfour recommends partial duodenectomy for multiple ulcers, calling attention to the fact that by this means the entire circumference of the duodenum is removed. He stresses the desirability of this operation in cases in

which the chief reason for surgery is repeated hæmorrhages. In the literature available to us we have found no reference to partial duodenectomy for mul-

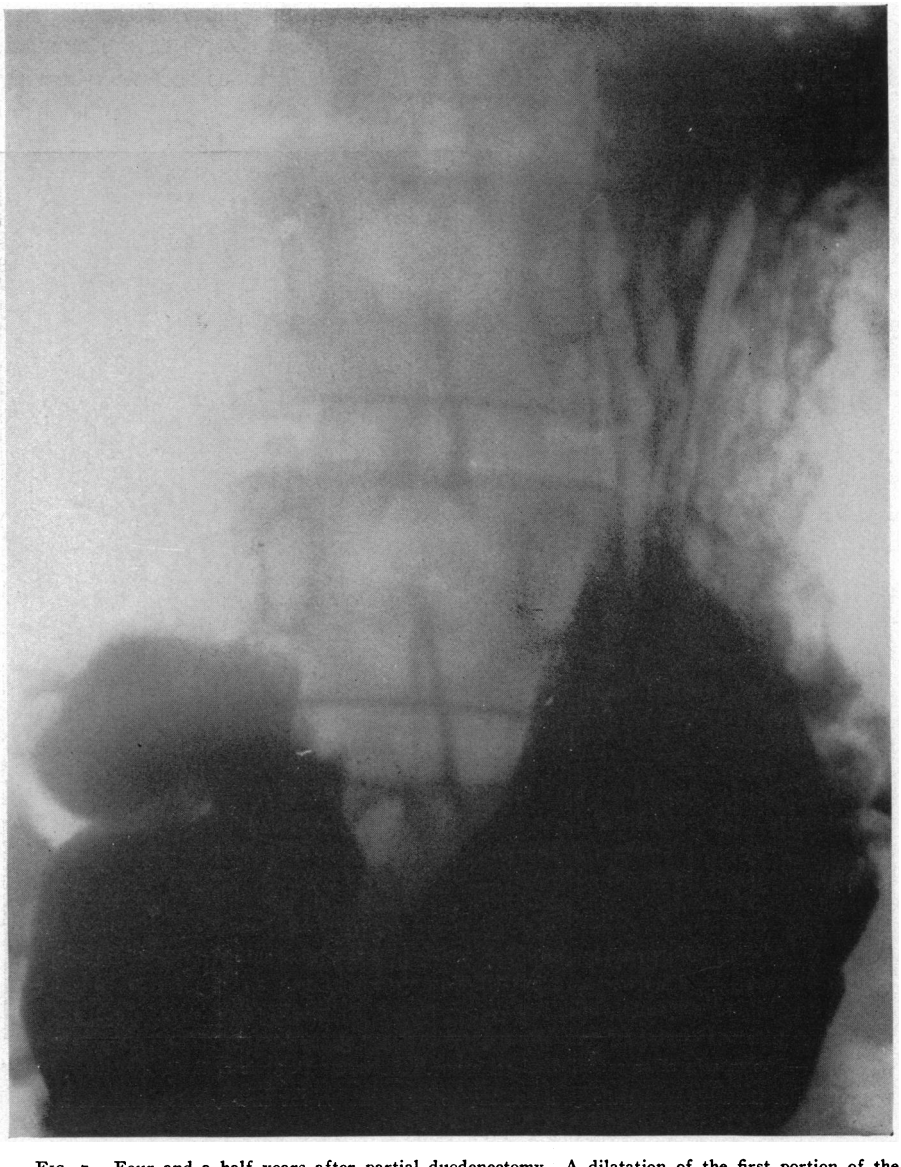

FIG. 7.—Four and a half years after partial duodenectomy. A dilatation of the first portion of the duodenum simulating the normal cap is to be seen. Note relative absence of rugæ here. Sphincteric action in stomach empties without difficulty.

tiple duodenal ulcers other than the reports by Balfour. As we think it a logical and practical procedure in suitable cases, we add this report to his in an effort to interest the profession at large in this operation.

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