

Surgical Management of Reflux Gastritis

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Reflux gastritis is now recognized with increasing frequency as a complication following operations on the stomach which either remove, alter, or bypass the pyloric sphincter mechanism. The entity may occasionally occur as a result of sphincter dysfunction in the patient who has not undergone prior gastric surgery. The diagnosis is made on the basis of symptoms (postprandial pain, bilious vomiting and weight loss), gastroscopic examination with biopsy and persistent hypochlorhydria. Remedial operation for correction of reflux is indicated in the presence of persistent symptoms when conservative measures fail. Only operative procedures which divert duodenal contents from the stomach or gastric remnant are effective. Both the isoperistaltic jejunal segment (Henley loop) and the Roux-en-Y diversion have been effective as remedial operations for reflux gastritis and merit greater awareness by gastroenterologists and surgeons. Our choice is the Roux-en-Y because of its technical simplicity and lower morbidity rate.

BILIOUS VOMITING was recognized as a complication of gastric surgery shortly after Anton Wolfler⁶¹ performed the first gastroenterostomy in 1881. The complication was likewise appreciated following the introduction of the Billroth II method of gastric resection in 1885.⁸ As a result, surgeons during the next several decades devised various types of gastroenteric anastomoses in hopes of obviating this distressing complication.²⁵ With the advent of gastroscopy, Hurst³² and Schindler⁵²⁻⁵⁴ were among the first to comment upon the relationship between gastroenteric stomas and gastric mucosal atrophy. Palmer,^{45,46} studying by gastroscopy the effects of gastric operations on the gastric mucosa, described gastritis as a frequent complication, but felt the inflammatory changes were in part a natural progression of the pre-existing state. Other observers,^{6,40} utilizing gastric biopsy, reported high instances of gastritis following gastric resection.

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During the past two decades an increasing number of investigators and clinical surgeons^{3,5,11,13,16,19,21,30,35,37,41,58,62} have recognized a symptom complex which has been termed alkaline reflux gastritis. This complication occurs in varying degree in 5-35% of patients who have undergone gastric surgery in which the pyloric sphincter mechanism was either removed, bypassed, or rendered incompetent. The symptoms are separate and distinct from the vasomotor and gastrointestinal disturbances of dumping and other postgastrectomy syndromes, and consist of diffuse upper abdominal pain, nausea and vomiting of bile stained material, weight loss, and gastrointestinal bleeding in some instances. The patients are usually achlorhydric by standard gastric analysis.

Within the past decade the widespread use of the fiberoptic gastroscopy, gastric biopsy, and electron microscopic study of gastric mucosa has increased our understanding of the pathophysiology of this condition. It has now been documented by pyloric pressure measurements and gastroscopic studies that some patients with intact stomachs may experience symptomatic reflux gastritis. It is further appreciated that bile and duodenal contents may be present in both the intact and postoperative stomach without producing deleterious effects. Likewise, documented gastritis may exist in the absence of clinical symptoms^{23,24,27,31,33} as only a few patients demonstrate this hypersensitivity to bile reflux.

Mild symptoms of reflux gastritis can be managed effectively by conservative measures consisting of diet, antispasmodics, and cholestyramine which has proven effective in some instances.^{2,56} However, if appreciable

symptoms exist, conservatism is fraught with failure and remedial operation is indicated. Experience has shown that only procedures which divert bile completely from the stomach are effective in alleviating both symptomatology and gastric mucosal changes.

The purpose of this communication is to relate a nine-year experience with 48 patients who underwent either a Roux-en-Y diversion or a Henley loop operation for severe symptoms of reflux gastritis which were not controlled by the usual nonoperative treatment. The operative management of this group of patients will be discussed along with followup results. A clinical appraisal of the two remedial procedures will be made.

Clinical Study

Of the 48 patients who underwent remedial operation for correction of reflux gastritis, 31 were men and 17 were women. The ages ranged from 10 to 81 years with most of the patients between 30 and 59 years of age. The original operation was performed for duodenal ulcer in 44 patients, stress ulceration in one patient, and a high lying gastric ulcer in one patient. Ten of the 48 patients had originally been subjected to bilateral truncal vagotomy-antrectomy and gastroduodenostomy (Billroth I). Seventeen patients had previously undergone truncal vagotomy-gastric resection and a Billroth II type reconstruction. Eleven patients had as the original operation a gastric resection of the Billroth II type without vagotomy. Seven patients had undergone a vagotomy and drainage procedure of which five were pyloroplasties and two were gastroenterostomies. One patient had been subjected to gastroenterostomy alone, and two patients had not had previous gastric surgery (Fig. 1).

The time interval between the original operation for ulcer and the onset of symptoms of reflux gastritis varied from a few weeks up to 20 years. Eighteen patients noted symptoms of reflux within 6 months, 13 patients experienced symptoms within 2 years, and 17 patients experienced a symptom-free interval ranging from 7 to 20 years.

Epigastric pain, unrelieved by antacids, was a presenting symptom in all patients. The pain was usually made worse by food, thus restricting the oral intake with resultant weight loss. Nausea and vomiting were also experienced by each patient. The emesis was bile

Fig. 1. Original operative procedures in the 46 patients who subsequently developed reflux gastritis. Two patients had not undergone prior gastric surgery.

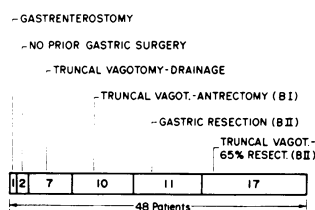
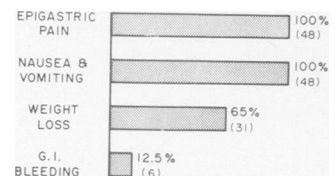


Fig. 2. Symptoms experienced by the 48 patients.



stained in most instances and was particularly annoying in the recumbent position and frequently interfered with sleep. Weight loss developed in 31 patients and ranged from 10 to 50 pounds, with an average weight loss of 23 pounds. Anemia of a microcytic hypochromic type was present in 19 patients. Six patients presented with gastrointestinal bleeding, and each required several transfusions while undergoing preparation for remedial surgery (Fig. 2). Gastric secretory studies, when done, revealed achlorhydria during fasting and following histalog stimulation in each patient who had undergone prior gastric surgery. The two patients who had not undergone previous gastric surgery demonstrated achlorhydria during fasting but showed a low acid response to histalog. Gastrointestinal barium studies failed to demonstrate a recurrent ulcer, stomal dysfunction, or other abnormalities among the entire group.

On gastroscopic examination duodenal content containing bile could be seen regurgitating into the gastric remnant and numerous bile lakes were scattered over the mucosa, which was usually granular, friable, and atrophic in appearance. The presence of multiple small superficial ulcerations was a frequent finding. Gastric mucosal biopsies demonstrated variations in the severity of the inflammatory process among the patients. No correlation, however, could be made comparing patient symptomatology with the extent of the gastric mucosal changes. Biopsy studies among the patients varied from a picture of acute focal mucosal hemorrhage with an inflammatory infiltrate in the lamina muscularis mucosa to superficial mucosal ulceration (Fig. 3). Reduction in mucosal thickness was noted along with chronic inflammatory infiltrates. Parietal and chief cell diminution was also apparent along with an increase in mucous secreting cells.

Cholestyramine was used in 10 patients in an attempt to remove the bile reflux but without significant benefit. The drug is given in granular form, is expensive, and is poorly tolerated. No patient had received ulcerogenic medications and alcohol was not a problem among the group.

Remedial Procedures

Two different remedial operations, each directed toward preventing bile and duodenal contents from entering the gastric remnant or stomach were utilized in the 48 patients. A Roux-en-Y diversionary operation,



FIG. 3. Gastric mucosal biopsy showing an area of superficial mucosal ulceration and a chronic inflammatory infiltrate in the lamina muscularis mucosa.

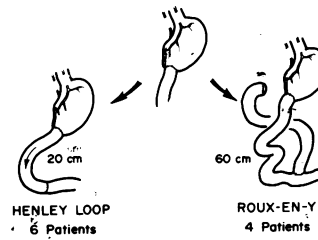


FIG. 5. Type of remedial operation carried out in 10 patients who originally underwent vagotomy-antrectomy-Billroth I.

of a modification thereof, was carried out in 27 patients and an interposed isoperistaltic jejunal segment between the gastric pouch and duodenum (Henley loop), was used in 20 patients. One patient who had undergone a simple gastroenterostomy for an alleged duodenal ulcer 20 years prior had the gastroenterostomy dismantled and no other gastric surgery performed as the duodenum was normal (Fig. 4).

Of 10 patients who originally underwent truncal vagotomy-antrectomy and a Billroth I reconstruction for ulcer disease, six were subjected to the remedial operation consisting of a Henley loop (utilizing an interposed jejunal segment, 20 cm. in length) and four underwent a Roux-en-Y diversion (Fig. 5).

Of 17 patients who initially underwent truncal vagotomy-gastric resection and a Billroth II reconstruction, five were converted to a Henley loop interposition, seven had a Roux-en-Y diversion, a Hunt-Lawrence pouch with a Roux-en-Y diversion was used in four, and a Valdoni circular loop was constructed and connected to the duodenal outflow tract in one patient. In this group the gastroenteric stoma was left intact in construction of the Henley loop operation and the Soupault-Bucaille maneuver was employed (Fig. 6).

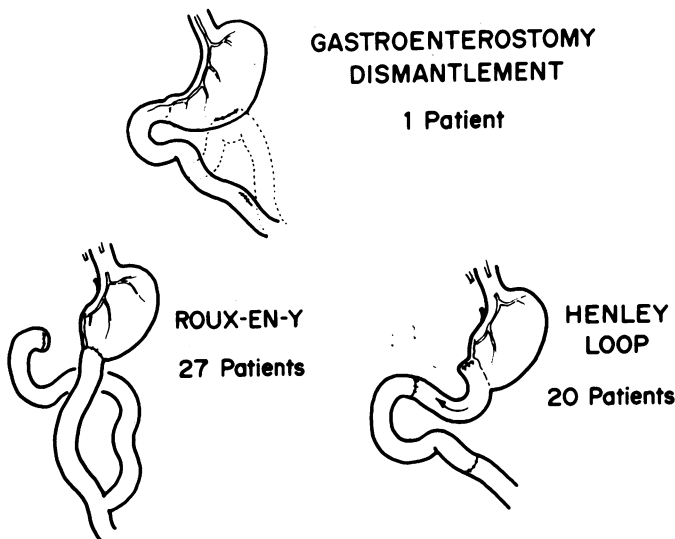


FIG. 4. Remedial operations done in the group of 48 patients.

TRUNCAL VAGOTOMY - 65% RESECTION

Billroth II (17 Patients)

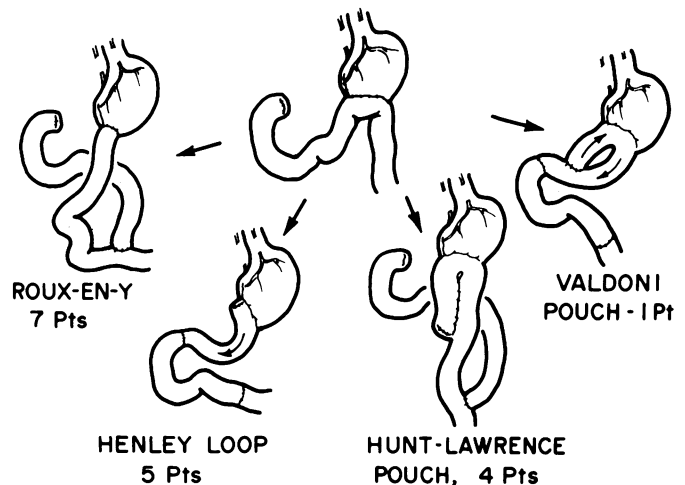


FIG. 6. Remedial procedures performed in 17 patients who originally had vagotomy-resection-Billroth II.

60-75% GASTRIC RESECTION - NO VAGOTOMY

Billroth II - (11 Patients)

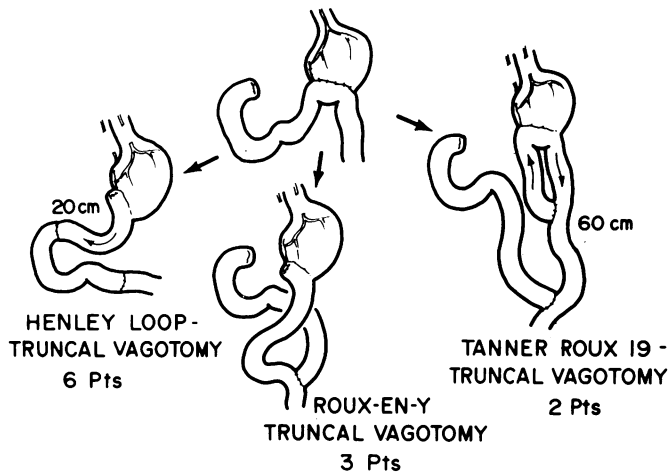


FIG. 7. Remedial operations in 11 patients who originally underwent gastric resection without vagotomy.

Eleven patients had originally undergone an estimated 60-70% Billroth II gastrectomy without vagotomy. Among six of this group the remedial operation consisted of a Henley loop procedure with addition of truncal vagotomy. Three patients were converted to a Roux-en-Y diversion and two patients underwent a circular loop pouch construction with a Roux-en-Y diversion (Tanner 19). Each of the five patients also had bilateral truncal vagotomy performed (Fig. 7).

Of seven patients who had undergone vagotomy with drainage as the initial operation, five were subjected to antrectomy and Roux-en-Y reconstruction. Two patients underwent antral resection and insertion of a 20 cm Henley loop (Fig. 8).

Two patients who had not had previous gastric surgery were treated by truncal vagotomy-antrectomy and Roux-en-Y reconstruction. The one patient with a simple gastroenterostomy underwent dismantling of the gastroenterostomy with reconstruction of the intact stomach (Fig. 9).

Hospital Course

A total of 16 patients who originally underwent a Billroth II type resection with or without vagotomy

FIG. 8. Remedial operations in seven patients following the original procedure of vagotomy with drainage.

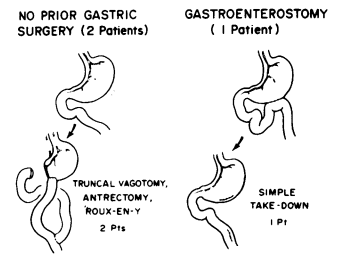
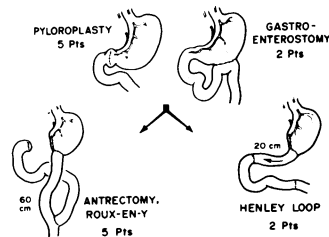


FIG. 9. Two patients having had no prior gastric surgery treated by vagotomy-antrectomy and Roux-en-Y. One patient had simple gastroenterostomy dismantlement.

were subjected to Roux-en-Y diversion. There was no significant complication in this group and the postoperative hospital stay averaged 8 days. Of the 12 patients with a Billroth II reconstruction with or without vagotomy subjected to a Henley loop procedure using the Soupault maneuver, nine experienced an uneventful recovery, but three patients developed transient fullness, stasis, and delayed gastric emptying which was alleviated with nasogastric decompression. The postoperative hospitalization averaged 11 days (Figs. 10-12).

Of four patients who underwent Roux-en-Y diversion following truncal vagotomy-antrectomy and Billroth I reconstruction, one developed prolonged gastric emptying which responded to additional nasogastric suction. The hospital stay among this group averaged 11 days. On the other hand, of six patients subjected to a Henley loop procedure following vagotomy-antrectomy and a Billroth I reconstruction, five experienced fullness following removal of the nasogastric tube, and normal emptying did not take place for at least two weeks (Figs. 13-16).

Of the seven patients who originally underwent vagotomy with drainage, five who subsequently had Roux-en-Y diversion with antrectomy experienced less postoperative morbidity than the two patients subjected to antrectomy with Henley loops (Fig. 17).

The two patients without a prior gastric operation treated by vagotomy-antrectomy with a Roux-en-Y diversion had uneventful postoperative courses. The one patient with the gastroenterostomy dismantlement experienced no complications.

Results

The followup after remedial operation among the 48 patients ranges from 6 months to 9 years. There was no

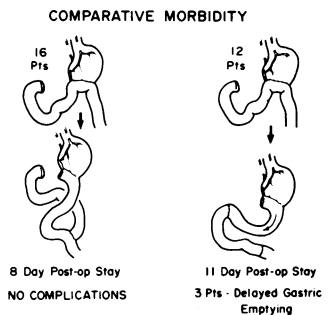


FIG. 10. Conversion from a Billroth II type anastomosis to Roux-en-Y was associated with less morbidity than conversion from a Billroth II to a Henley loop.

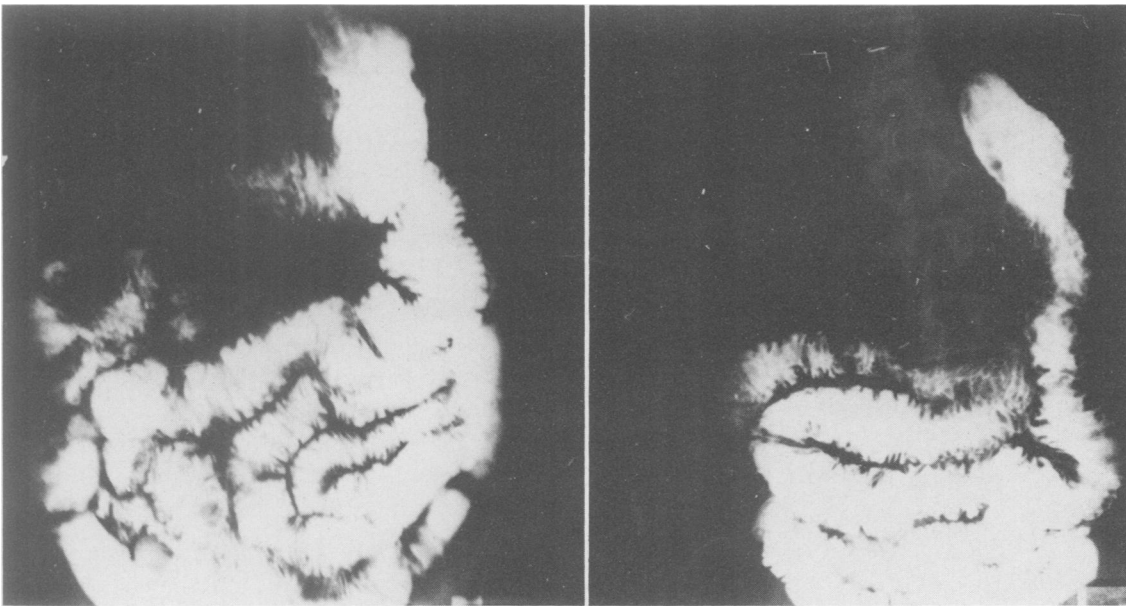


FIG. 11. (Left) Barium study following Billroth II reconstruction. (Right) Conversion to Roux-en-Y showing normal emptying with no dilatation of the gastric pouch. No emptying problems occurred in 16 patients.

operative mortality but one late death occurred from myocardial infarction. Of the 27 patients comprising the Roux-en-Y group 17 have obtained an excellent clinical result, and a good result has occurred in 10. The patients comprising the latter group note occasional fullness and mild discomfort but epigastric pain and nausea and vomiting have been completely relieved. There was essentially no difference in the results between men and women patients. Among the 20 patients in the Henley loop group, 14 have obtained an excellent result and four are graded a good result. One patient continues to note epigastric discomfort and vomits occasionally. He has been graded a fair result. One patient has been termed a poor result as he continues to experience nausea and vomiting at times which could be related to the dumping syndrome. He still shows a 25 pound weight

loss which occurred following the original vagotomy and antrectomy and Billroth II reconstruction. He is also anemic but repeat gastroscopic studies demonstrate improvement in the degree and extent of gastritis (Fig. 18). Conversion from a Henley loop to a Roux-en-Y as reported by Woodward has not been necessary.⁶³

Of the 31 patients among the 48 who lost weight after the onset of symptoms of reflux gastritis, weight gain has occurred in 17, with one patient showing a weight gain of 50 pounds. Weight gain has taken place in 11 patients who underwent a Roux-en-Y diversion and in six patients with Henley loops. The four patients with a Hunt-Lawrence pouch and Roux-en-Y diversion had each lost considerable weight prior to the remedial procedure and a weight gain of 10-40 pounds has taken place among the four patients. The single patient with the gastroenterostomy dismantlement has gained 20 pounds and is free of symptoms. The one patient in the group alluded to who underwent a Henley loop procedure and died of unrelated causes 8 months later, obtained a good result.

The relief of abdominal pain and bile stained vomiting

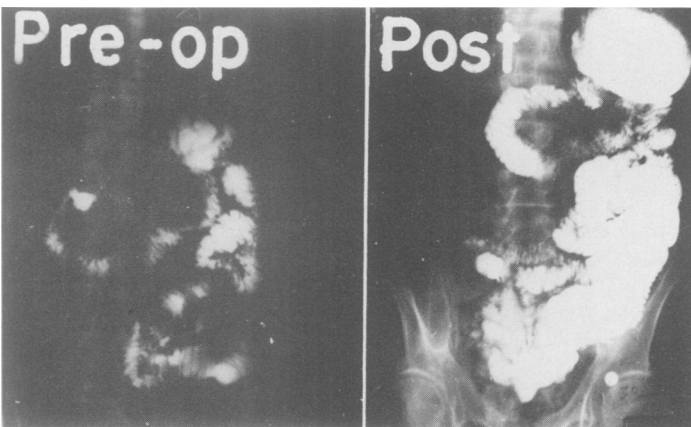


FIG. 12. (Left) Original Billroth II reconstruction with a small gastric pouch. (Right) Barium study in the early postoperative period after conversion to a Henley loop shows some gastric pouch dilatation and stasis.

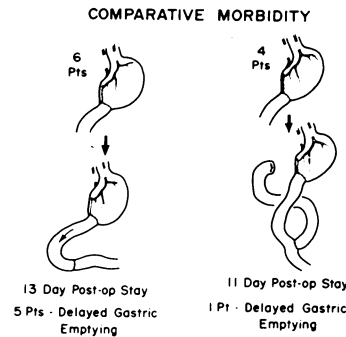


FIG. 13. Conversion from a Billroth I anastomosis to Roux-en-Y was also associated with less morbidity than conversion from a Billroth I to a Henley loop.

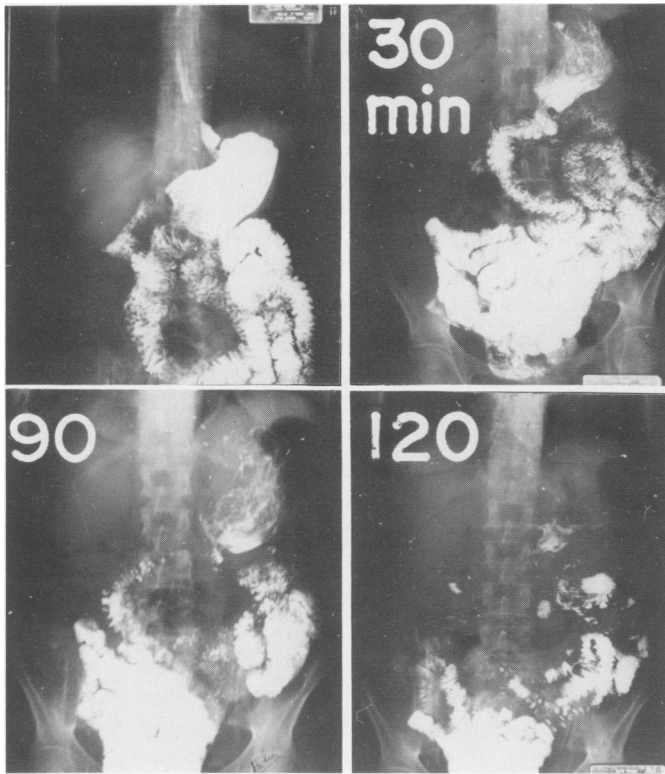


FIG. 14. Roux-en-Y remedial procedure following an original vagotomy-antrectomy-Billroth I. Barium study shows no evidence of gastric pouch stasis.

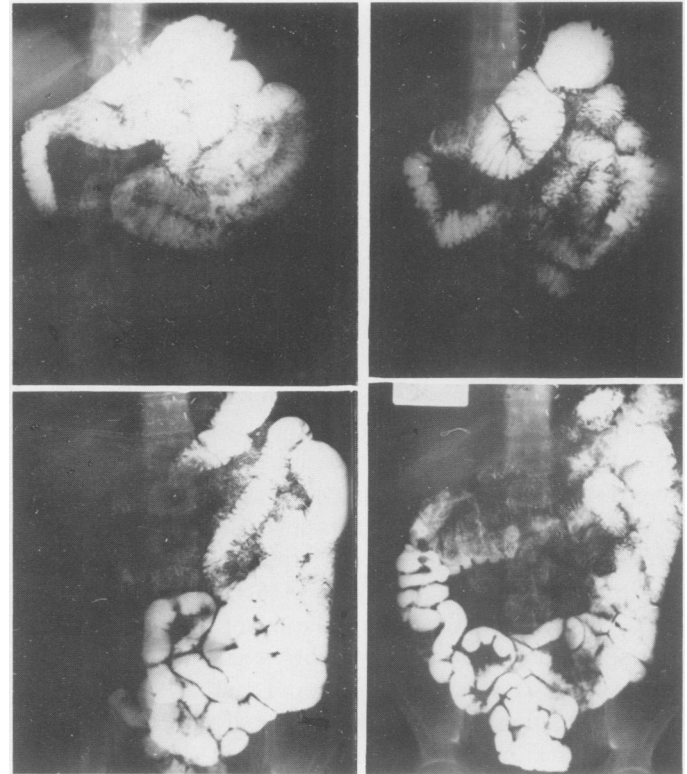


FIG. 16. Barium study several weeks postoperatively showing no evidence of stasis in the gastric pouch or isoperistaltic jejunal segment (Henley loop).

has been dramatic in the group and is readily apparent during the early postoperative period. The symptomatic improvement is also associated with marked improvement in the endoscopic appearance of the gastric mucosa.

Discussion

It has been recognized for many years that varying degrees of gastritis occur after both simple gastroen-

terostomy and a Billroth II gastric resection. With increasing use of the Billroth I method and also pyloroplasty in the past two decades, it has become apparent that gastritis may likewise follow these procedures. Prior

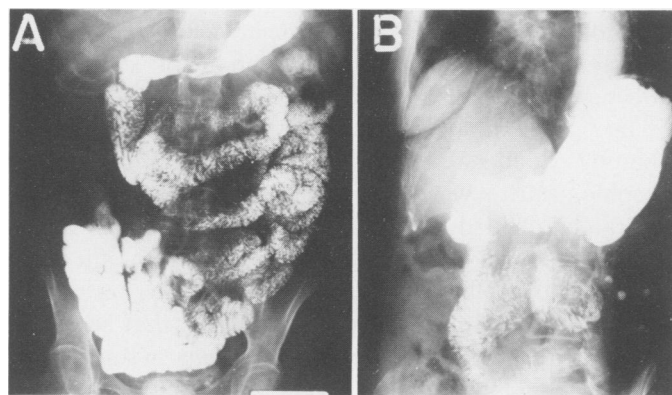


FIG. 15. (A) Barium study showing Billroth I reconstruction with antrectomy. (B) Conversion to Henley loop interposition procedure in the early postoperative period demonstrating marked dilatation and stasis in the gastric pouch. Clinical symptoms of stasis were present.

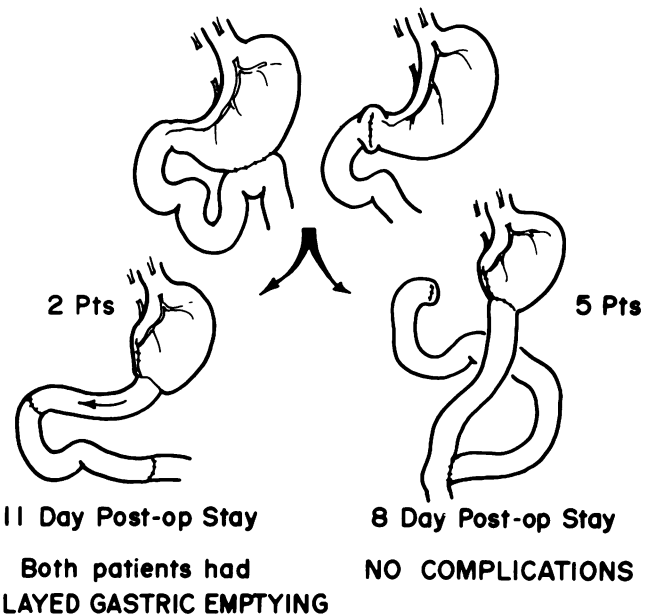


FIG. 17. With vagotomy and drainage, patients converted to Roux-en-Y experienced less morbidity than patients with Henley loops.

	EXCELLENT	GOOD	FAIR	POOR
ROUX-EN-Y (27 Pts)	17	10	0	0
HENLEY LOOP (20 Pts)	14	4*	1	1
GASTROENTEROSTOMY DISMANTLEMENT (1 Pt)	1	0	0	0

FIG. 18. Results with the two remedial operations for treatment of reflux gastritis.

*1 death 8 months post-op of unrelated causes.

to 20 years ago both the clinical significance and the pathophysiology of reflux gastritis were poorly understood. Mimpres and Birt,⁴³ and Roux *et al.*⁵¹ theorized that bile emesis represented either stomal, afferent, or efferent loop obstruction. Indeed, some patients were even labeled as suffering from psychoneurosis.

During the past two decades several British and South African investigators^{15,22,39,58,60} have documented the fact that in susceptible persons emesis of duodenal contents may result from accumulation of bile and pancreatic secretions in the postoperative stomach in the absence of obstructive phenomena. Lawson³⁷ was among the first to demonstrate experimentally both inflammatory and proliferative changes in the canine gastric mucosa following various gastric procedures designed to allow duodenal secretions, bile, and pancreatic juice to come into contact with the gastric mucosa. Gastric mucosal changes were most prominent with a combination of bile and pancreatic juice, less striking with bile alone and even less pronounced with pancreatic juice. Lawson³⁸ further showed that diversion of the total duodenal content into the stomach produced an extensive degree of gastritis, greater than that observed after gastroenterostomy or pyloroplasty. In operations where the pyloric antrum was removed, reflux gastritis extended far into the gastric remnant, but in gastric procedures which preserved the antrum, the gastritis was less extensive.

Lawson³⁶ in classical experiments demonstrated that atrophic gastritis with disappearance of parietal and chief cells occurred in the fundic mucosa following both a Billroth I and Billroth II resection. Despite excision of the alkaline antral area, a new alkaline zone developed in the gastric pouch. Capper,¹¹ aside from studying the histology of the gastric mucosa in the postresection state, estimated the altered pH of the mucosa and, due to replacement by mucous secreting cells, found the residual gastric mucosa highly alkaline. In patients with a Roux-en-Y reconstruction, however, he observed that the gastric mucosa remained acid secretory in type down to the gastrojejunal anastomosis.

DuPlessis^{20,22} was one of the first investigators to study the effects of duodenal reflux in patients with atrophic gastritis and gastric ulcer. He found the concentration of bile acid conjugates in fasting aspirates of patients

with gastric ulcer to be normally high. Black⁹ noted that fasting and postprandial bile acid concentrations were higher in patients with atrophic gastritis and gastric ulcer than in normal individuals. Rhodes,⁴⁸ employing radioactive-tagged bile salts and measuring the concentration of radioactive bile salts in the postprandial gastric aspirate, found that in patients with gastric ulcer, duodenal regurgitation was greater than in normal controls. Cheng, Delaney and Ritchie¹⁴ conducted experiments in which tubes of gastric wall with intact vasculature were fashioned from the greater curve of the dog's stomach and interposed at various sites in the gastrointestinal tract and biopsied at intervals. Exposure of the gastric wall to jejunal contents led to rapid and profound mucosal inflammatory changes with loss of both parietal and chief cells. Exposure of the wall to ileal content produced a similar effect. On the other hand, exposure of the gastric wall to pancreatic juice resulted in morphological changes but they were milder and slow to develop. These authors also demonstrated a marked loss of both parietal and chief cell mass after Billroth II type resection along with an increase in mucous secreting structures. These changes were not apparent in Billroth I cases up to one year.^{18,49,50}

Menguy and Max⁴² anastomosed the gastric antrum to the gallbladder in 14 animals and subsequently demonstrated severe inflammatory and proliferative changes in the antral mucosa. Beyers and Jordan,⁷ however, were unsuccessful in their attempts to show that bile *alone* produced gastritis. Davenport,¹⁷ using irrigations of bile and bile salts, demonstrated disruption of the gastric mucosal barrier with back diffusion of hydrogen ions and subsequent release of pepsin into the gastric lumen with resultant gastritis. Skillman⁵⁷ has described disruption of the gastric mucosal barrier in shock subjects, and Hamza²⁶ feels that bile salts contribute to the formation of gastritis and ulceration in experimental shock. Many observers currently feel that in addition to alterations in the protective qualities of gastric mucous produced by alkaline reflux, acid must be present in the stomach or gastric remnant for gastritis and ulceration to occur.

The exact biological and biochemical mechanisms whereby duodenal contents produce diffuse and/or atrophic gastritis with resultant ulceration have not been accurately defined. Apparently, however, the presence of both bile acid conjugates and pancreatic juice are necessary to produce significant changes. Recently both Bedi⁴ and Nahrwold⁴⁴ have demonstrated that both bile and bile salts in low concentrations result in antral gastrin release. Thus, gastrin may perhaps be an additional contributing factor in producing gastritis and ulceration. Others think that gastrin may have a trophic effect on the gastric mucosa and exert a protective action by "tightening the mucosal barrier."⁶³

More recently Fisher²⁴ has studied alterations in pyloric sphincter pressures in patients with increased duodeno-gastric reflux, gastritis, and ulceration. Upon stimulation such patients showed no change in sphincter response to either endogenous intraduodenal stimuli or exogenous administration of secretin or cholecystokinin. This was in sharp contrast to normal subjects. Capper¹² has likewise described a test to detect pyloric regurgitation.

Lately it has been suggested by Anderson¹ that parenteral hyperalimentation be used as a diagnostic test to further document reflux gastritis as being responsible for patient symptomatology. Total parenteral hyperalimentation results in a marked decrease in both biliary and pancreatic flow, and the authors postulated that in the presence of diminished flow both symptomatic and histologic improvement should take place. Their results showed that following institution of therapy, symptoms improved, reflux reduced, and parietal cell mass increased in two of three patients. The test was felt to be useful in evaluating surgical candidates and as supplementary preoperative support for patients who were malnourished.

Only operative procedures designed to divert duodenal and proximal jejunal contents from the stomach or gastric remnant have proven satisfactory in correcting symptoms of gastric reflux. Roux-en-Y diversion with or without a complimentary pouch reservoir or a Henley loop procedure appear to be effective. In our series of 48 patients the long-term results with the two procedures were comparable. From a survey of the literature many surgeons^{3,10,15,16,19,34,39,47,55,59,60} currently prefer a Roux-en-Y diversion with a defunctionized jejunal limb 45–60 cm long.⁵⁵ With increasing interest and appreciation that reflux gastritis may be a distressing complication of definitive operation for ulcer, DuPlessis²² has proposed for consideration the use of a Roux-en-Y limb as the method of reconstruction in primary operations for gastric ulcer. Both Henley²⁹ and Hedenstedt²⁸ have used a Henley loop in combination with vagotomy and partial gastrectomy as a primary operation for both gastric and duodenal ulcer.

The advantage of the Roux-en-Y technique is its technical simplicity, particularly if the original gastric procedure was a Billroth II type resection. The simple maneuver of shifting the afferent jejunal limb to the efferent limb, leaving the gastrojejunostomy undisturbed, has been associated with very little postoperative morbidity in most reported studies.

Patients undergoing a Roux-en-Y diversion following an original Billroth I reconstruction have experienced increased postoperative morbidity when compared to those patients undergoing Roux-en-Y diversion following an original Billroth II type resection. Take-down of

the original gastroduodenostomy in the Billroth I procedure and conversion to end-to-end gastrojejunostomy resulted in delayed gastric emptying in one of four patients in our study. Conversion of a Billroth II type resection to a Henley loop procedure, although leaving the gastroenterostomy intact, still possesses the disadvantages of dissecting out and reopening the duodenal stump and the construction of two anastomoses. The morbidity in this group was greater when compared to patients undergoing a Roux-en-Y diversion after a Billroth II type resection.

Construction of a Henley loop after an original Billroth I reconstruction poses a more complicated problem and increased morbidity occurred with this group. The remedial procedure, of course, entails take-down of the gastroduodenostomy and the construction of three separate anastomoses. The interposed jejunal segment placed in its new domain may also require several days to several weeks for physiological adjustments to take place, and early emptying problems are frequent. Nasogastric suction was maintained in our group of six such patients for four to five days, and it was not unusual for such patients to experience abdominal fullness and early satiety for several weeks postoperatively.

Patients who originally underwent vagotomy with drainage and later Roux-en-Y diversion with antrectomy experienced less postoperative morbidity than such patients subjected to antrectomy with Henley loops. After a few weeks, however, in the vast majority of instances, with either remedial procedure epigastric fullness subsides and the patients are able to eat a normal meal. Radiographic studies show a return of the gastric remnant to normal. In performing either remedial operation we prefer to remove the gastric antrum because each procedure is ulcerogenic. Complete gastric vagotomy is obligatory.

It is our current feeling that the clinical entity of reflux gastritis is being diagnosed with increasing frequency. However, extreme caution should be exercised in not ascribing the symptoms of other postgastrectomy or postpyloroplasty sequelae to reflux gastritis. Likewise, the mere documentation of duodenogastric reflux, the presence of bile in the stomach, or reflux gastritis of mild degree with minimal symptomatology does not constitute an indication for remedial surgery. However, we share the feeling of other observers that in carefully selected patients with characteristic and sustained symptomatology documented by gastroscopy, biopsy, and persistent hypochlorhydria, that remedial operation is indicated. In our 48 patients the postoperative clinical results have been gratifying.

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DISCUSSION

DR. CARL P. SCHLICKE (Spokane): One's first reaction on hearing this paper is to wonder how anyone could accumulate 48 patients who required surgical intervention for the relief of alkaline gastritis. However, those who had the privilege of hearing Dr. Herrington's presentation before the Western Surgical Association in 1972, in which he reported a 25-year experience with vagotomy and antrectomy performed on 3584 patients, realize what an extraordinarily large experience with gastric surgery he and his colleagues have enjoyed.

Secondly, in spite of the number of investigators who in the past 20 years have called attention to reflux gastritis as a cause of postoperative distress, it is surprising how seldom the condition is recognized. In the first edition of the "gastric gospel" by Harkins and Nyhus, which appeared in 1962, the subject receives only cursory mention, and no allusion to it appears in any of the Year-books of Surgery since that time.

The bilious vomiting and nocturnal regurgitation so characteristic of reflux gastritis may erroneously be attributed to operative production of an incompetent cardioesophageal mechanism, whereas the true fault lies in the disruption of the pylorus. Attempts to restore the physiologic status of the structures in the vicinity of the esophageal hiatus, obviously, are of no avail, while remedial operations, such as Dr. Herrington has described, which prevent the entrance of bile and duodenal contents into the gastric remnant, will not only relieve these distressing symptoms, but will also result in an improvement in the endoscopic appearance of the gastric mucosa.

It is the gastroscopists who have described how commonly one finds bile and duodenal contents in the postoperative stomach; and yet, as has been pointed out, even in the presence of obvious gastritis, comparatively few patients exhibit the classical symptoms. How do these miserable people differ from their asymptomatic fellows?

In the authors' series there is an overwhelming preponderance of reflux gastritis following Billroth II reconstruction, and I wonder if this represents an indictment of the procedure, or was this simply because more of their patients were hooked up this way?

Our own limited experience with patients in whom operation has been necessary would bear out the authors' observation that, in general, a Roux-en-Y diversion is simpler and safer than interposition of a Henle loop; this is particularly true after a Billroth II reconstruction, where you only need to disconnect the afferent limb and attach it to its efferent companion. I would question the need for establishing a defunctionalized limb two-thirds of a yard in length, as some people have advocated, and I must confess that I had never thought of offering either of these operations to a patient who had not undergone previous gastric surgery.

Drs. Herrington, Whitehead, and Sawyers are certainly to be commended for reminding us that reflux gastritis may be responsible for the distress which certain patients experience following operations on the stomach, and for pointing out that such symptoms, when they do occur, are highly characteristic, objec-

tively documentable and surgically remediable, should conservative measures fail to afford relief.

DR. MARSHALL K. BARTLETT (Boston): What we now call reflux gastritis has been called by various names over the years. The commonest was "afferent loop syndrome," it being thought that bile and pancreatic juice pooled in a dilated and perhaps partially obstructed afferent loop then dumped into the stomach producing pain with relief by vomiting of a considerable volume of bilious material. Since this was often brought on by food, caloric intake was decreased, and weight loss was very frequently of a substantial amount.

We got interested in this subject about the same time Dr. Herrington and his coworkers did, and in 1968 we reported our experience with a small series of five patients. The symptoms our patients had were very much like what you have heard in this series. I think it's interesting that the onset of these symptoms may be anywhere from a few days or weeks after the operation to many years; and why that spread occurs, I haven't the slightest idea.

Even in that early experience we had it was quite evident that it was not necessary to have an afferent loop, because it occurred after pyloroplasty and after Billroth I anastomoses.

In none of the patients we have operated on has there been any evidence of dilatation or obstruction of the afferent loop, in those where there was an afferent loop present. We have used the Roux-en-Y technique. It was reported by Dr. Norman Tanner with considerable success, and so we have simply followed his instructions. We do put the point of inflow of duodenal contents down 50 cm below the gastrojejunostomy. That was reinforced by one of our early patients who had the operation done elsewhere, and it had been put in 25 cm down, and no relief occurred. We moved it down another 25 and he was cured. So we think there's something mystic about something in the range of 50 cm.

This is quite a simple procedure to do, as you have heard from Dr. Herrington, and so we have continued to use it since then.

As far as I know, we have not had a single stomal ulcer, which is perhaps a little surprising. I judge Dr. Herrington has not had any either. Perhaps he would comment on that specific point.

Why it is that with all the patients who have bile and pancreatic juice refluxing into their stomachs after operation, only a few get reflux gastritis remains a total mystery.

DR. WILLIAM S. McCUNE (Washington, D. C.): Our work has been done largely by Dr. Joseph and Dr. Geelhoed. We do not have as many cases as Dr. Herrington.

We agree with the authors that the chief symptoms are bilious vomiting, epigastric pain and discomfort, nausea, and weight loss. Also, I think it is worth mentioning, as he did in his paper, that some blood in the stools is fairly common, and that, of course, there are changes which can be recognized by gastroscopy. I think it's very important to carry out gastroscopy in all these cases; and also to perform an upper g. i. series. The purpose of the gastroscopy is not only to make the diagnosis, but to rule out stomal ulceration.