The Surgical Management of Achalasia of the Esophagus *

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In prior communications we expressed our dissatisfaction with methods of surgical correction of achalasia of the esophagus then being utilized, and reported on the early results of the operation of esophagocardiomyotomy which appeared to be eminently successful.[4, 5, 6, 9] This operative procedure was then adopted to the exclusion of all others for achalasia, and has now been performed in 35 patients. The experience gained from these cases particularly during their postoperative course forms the basis for this report.

It has been variously estimated that 80 to 85 per cent of patients with achalasia will respond to periodic esophageal dilatation and medical management.[10] The remainder will require surgical intervention for relief. In the group of patients reported herein, dilatation and medical therapy had been carried out in 28 cases or 80 per cent. These cases were selected for surgery because of eventual failure to respond to conservative therapy or repeated dilatations. The other seven patients were selected for surgical therapy because they refused dilatation or it was deemed hazardous.

Our experience with esophagocardiomyotomy has been so promising in so far as the correction of dysphagia is concerned, that we feel that its indications should be extended. Surely, the patient who requires only a very occasional dilatation for relief would not be a candidate, but others who require regular instrumentation over a period of years for comfort might be spared this by earlier surgical intervention.

CASE MATERIAL

In the present series there were slightly more females than males; the ratio being 60 : 40. The youngest patient treated was 17 years old and the oldest was 74. The rest were scattered in all age groups of adult life (Table I). Achalasia has been recorded in the very young.[12] One patient in this group who received surgical treatment at 17 years of age had developed the condition when only 11.

The duration of symptoms was quite variable, ranging from 18 months to 30 years (Table II). The average duration of symptoms was 13.4 years. It is apparent that many patients live with their symptoms or intermittent periods of symptoms for years before operation is advised.

The predominant or presenting symptom was dysphagia. This was the first and most significant complaint in 86 per cent although the remainder eventually developed difficulty in swallowing (Table III). Usually this distress was more manifest upon the ingestion of solid foods, and the patients often learned to force food through by taking large volumes of warm liquids or carbonated beverages. Those who were unable to wash food through would manage to regurgitate all or a portion of the meal in order to relieve the sense of fullness. This mechanism was noted by 60 per cent. Vomitus usually consisted of frothy undigested material ingested at previous

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TABLE I.

AGE DISTRIBUTION OF PATIENTS WITH ACHALASIA

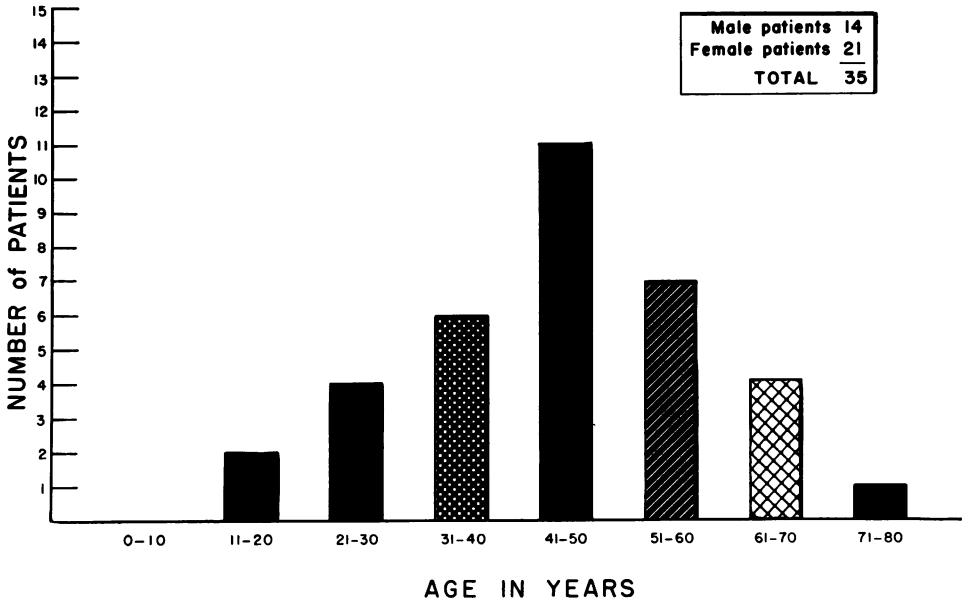
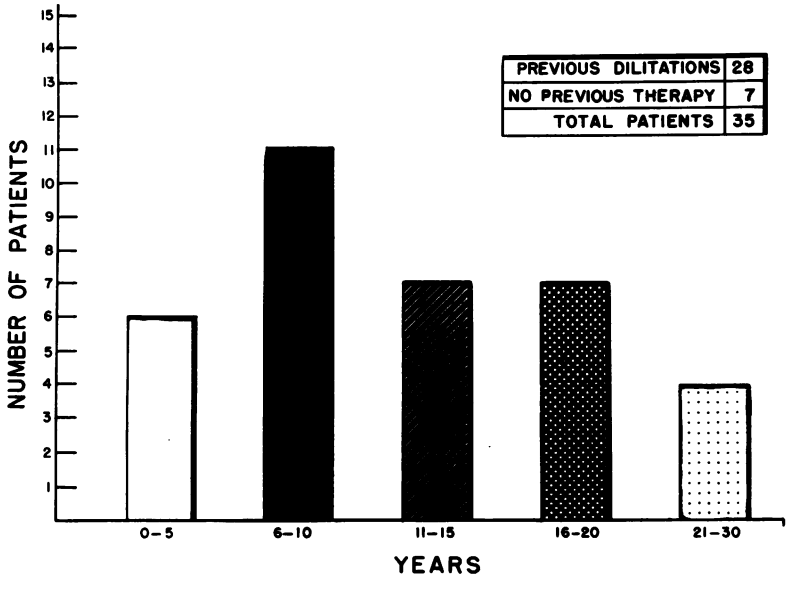


TABLE II.

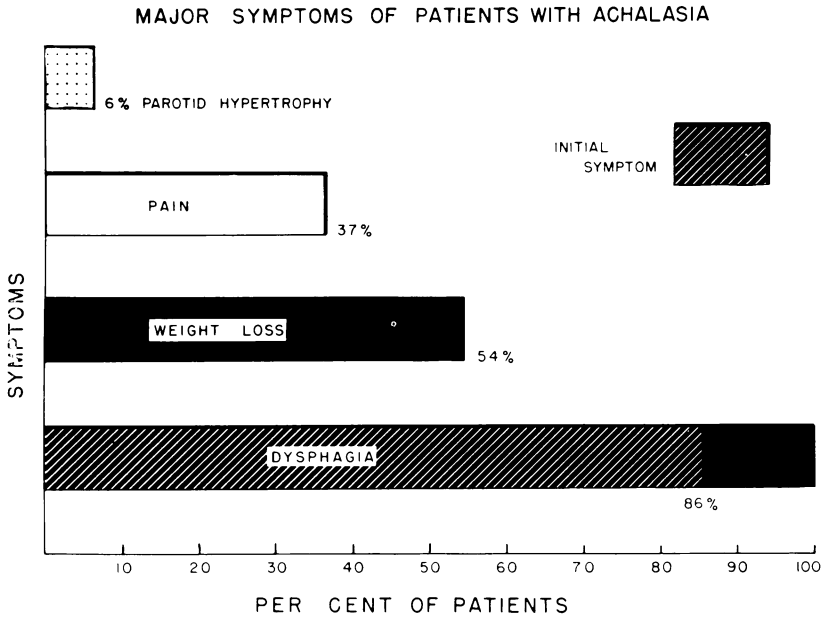
DURATION OF SYMPTOMS OF PATIENTS WITH ACHALASIA



meals with no gastric or duodenal contents.

Pain was a major feature in the clinical picture in one-third of this group. Its location was usually substernal with occasional reference to the back or around each costal margin. It was characterized either as a "cramp" or "spasm" or as an intense burning sensation. No correlation existed between the presence of pain and a char-

TABLE III.



acteristic roentgen picture or gross finding at operation which could serve to place these patients in a category separate from those with dysphagia only.[12]

Nineteen patients, or 54 per cent of the group, presented with weight loss ranging from five to 85 pounds. Many found that by taking small frequent feedings or forcing food through with liquids they were able to maintain normal nutrition.

An associated finding of interest was the presence of hypertrophy of the parotid salivary glands. This was noted in two patients; both had suffered with achalasia for ten years. In one this hypertrophy was so marked that a biopsy of the parotid had been taken at another hospital and roentgen therapy was administered to the parotid areas (Fig. 1). It is likely that this enlargement was a compensatory one secondary to the need for excessive saliva for deglutition.

Roentgen Features. Functional esophageal obstruction was universal in this group. All had dilatation of the esophagus which varied from minimal to a marked degree. In those with minimal or moderate dilatation, the esophagus was noted to be enlarged in a fusiform or cylindrical fashion (Fig. 2). In patients who had very marked dilatation, there was often an elongation of the esophagus as well which produced tortuosity and resulted in sigmoid or flask-shaped deformities (Fig. 3, Fig. 4). In the latter an actual "water-trap" was present in the erect position as a portion of the lower esophagus sagged below the level of the esophagogastric junction (Fig. 5).

In our experience these two extremes of deformity have been related to the duration of the lesion and its severity rather than different clinical types. For example, the sigmoid or flask-shaped deformity generally was noted only in those who had had achalasia for ten or more years. That this is not universally true is exemplified by the fact that one patient who had been troubled with achalasia for 28 years had a minimal fusiform dilatation while another case of only three years' duration had marked redundancy of the esophagus.

FIG. 1. Bilateral parotid salivary gland hypertrophy in a patient with achalasia of ten years' duration.

The terminal esophagus was quite narrow in all cases. Most often the dilated esophagus tapered smoothly to this zone of extreme narrowing which was usually 2 to 3 cms. in length and opened to a caliber of several millimeters to allow a thin trickle of contrast material to pass (Fig. 6). In a few the transition from the dilated esophagus to the narrowed area was so abrupt that an organic stricture was suspected (Fig. 7). In either type, the administration of a Seidlitz powder resulted in release of the obstruction and rapid passage of the barium into the stomach.

By fluoroscopic examination it was noted that motor activity of the esophagus was deranged in all cases. If peristaltic activity was noted by the fluoroscopist, it was described as disorganized or dysrhythmic. Waves generally stopped at the level of the aortic arch, or if they progressed distally, they did so in a disorderly fashion and were not capable of opening the gastroesophageal schincter. Reverse peristaltic activity and tertiary waves were common. The contrast material remained in the esophagus as long as the patient was in the recumbent position. In the erect position retention was variable, but often was as marked as 95 per cent at the end of an hour.

These observations would seem to support the thesis that the entire esophagus is involved in this disorder and that the defect is not limited to the esophagogastric area.

Preoperative Esophagoscopy. Preoperative esophagoscopy was carried out one or more times in 31 patients. In three of these there were changes described by the esophagologist as representative of esophagitis. It is noteworthy that two of this three developed esophageal ulceration postoperatively.

Operation. A modified Heller operation or extramucosal esophagocardiomyotomy was performed in each instance. Details of the surgical technic of this procedure have been described by Maingot.[8] Briefly, the cardioesophageal junction is exposed by mobilization of the left lobe of the liver. The peritoneal reflection about the esophageal hiatus is divided and the lowermost thoracic esophagus is delivered into the abdomen by traction. The anterior esophageal wall is incised in a longitudinal direction beginning two and one-half inches above the gastro-esophageal junction and extending to one and one-half inches be-

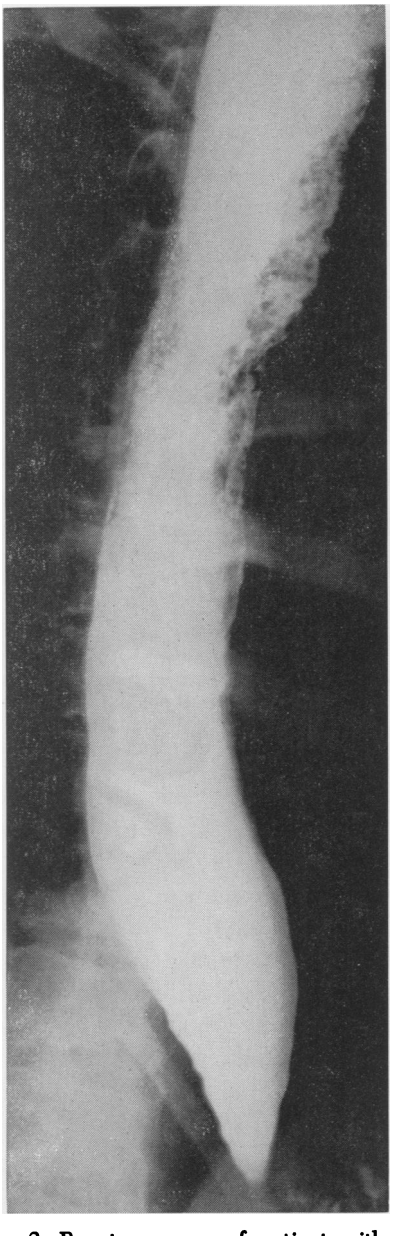


FIG. 2. Roentgenogram of patient with achalasia showing cylindrical or fusiform dilatation of the esophagus.

low the junction. The longitudinal and circular muscles and the submucosa of the esophageal wall are divided, and the mucosa is allowed to bulge through this aperture. The lumen of the esophagus is not entered. Often there are some fibrous strands in the submucosa or some small

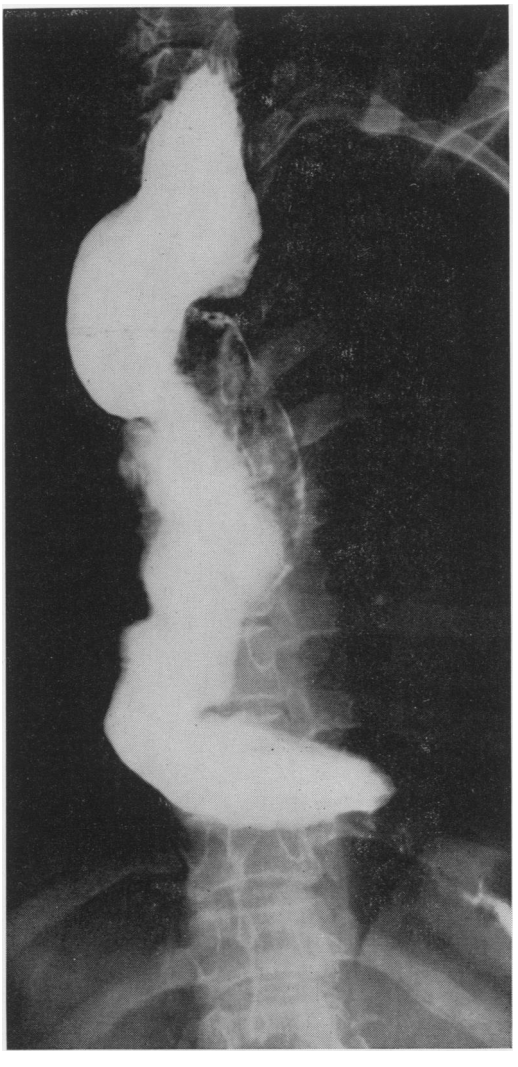


FIG. 3. Dilatation plus elongation and tortuosity of the esophagus in a case of achalasia resulting in the sigmoid type of deformity.

arteries which course transversely across the terminal esophagus and these should be divided to allow a full bulge of the mucosa.

In 33 operations the approach was by the transabdominal route, and the exposure was most adequate. Two were carried out through a transthoracic approach in order that the entire esophagus could be inspected. The latter approach is unnecessary unless carcinoma is suspected or unless one desires to incise the esophageal wall

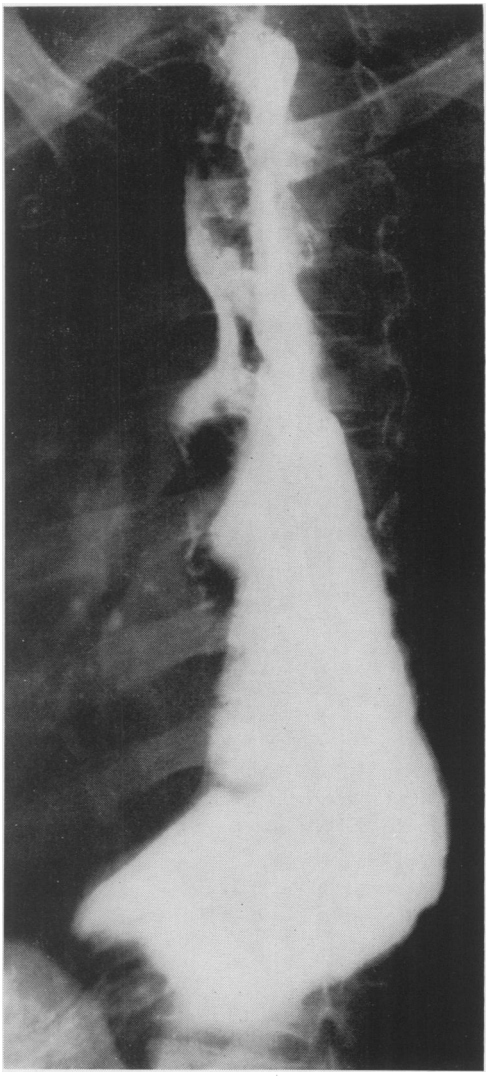


FIG. 4. Flask-shaped deformity in roentgen picture in a case of achalasia of the esophagus.

for a greater distance than recommended here.[3]

In the last eight patients a complementary pyloromyotomy has been performed at the time of the Heller procedure. The rationale of this addition will be referred to later.

The gross findings at the time of operation have been described in detail elsewhere.[6] Suffice it to say that hypertrophy of the circular muscle coat at the zone of narrowing was evident in only six patients. It was impossible to correlate this finding with the presence or absence of pain preoperatively or with a particular type of roentgen deformity. A biopsy of the muscle layers of the stenosed area was taken in eight patients; four of these were found to lack ganglion cells. It is apparent that Auerbach's plexus is not invariably absent as previously held.[1, 7]

FIG. 5. Roentgenogram in achalasia depicting extreme redundancy of the esophagus producing a "water trap" at the distal end of the esophagus. Note how the esophagus has sagged over the right hemodiaphragm to a position lower than the esophagogastric junction.

RESULTS

Thirty-four patients survived this operation. One patient died on the fifth postoperative day of a cerebrovascular accident. The others were discharged from the hospital after an average of 12 days. All were completely asymptomatic from the standpoint of dysphagia and substernal pain. All tolerated a full diet without regurgitation or vomiting.

There have been three late deaths; these occurred two, two, and four years postoperatively. The causes of death were carcinoma of the mid-esophagus, pneu-

FIG. 6. Roentgenogram revealing a long smooth tapering of the distal esophagus to the zone of constriction.

FIG. 7. Seriogram of the distal esophagus denoting an abrupt transition from the dilated area to the narrowed zone which appears as an organic stricture.

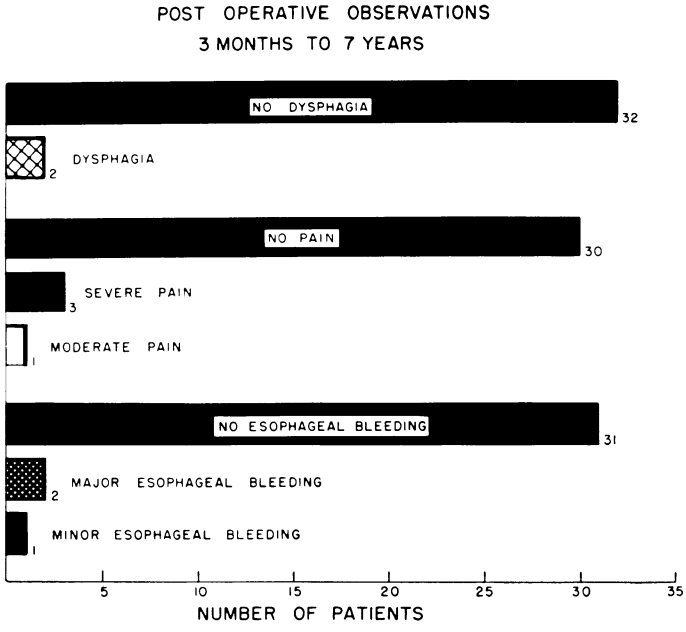
monia, and pulmonary tuberculosis respectively. In view of the fact that these patients were followed closely prior to their demise and that two of them developed complications related to operations for achalasia, they are included in the breakdown of our results. Thus there were 34 patients with followup observations ranging from three months to seven years after operation (Table IV).

As stated all patients had developed dysphagia by the time of surgical treatment and all patients had complete relief of dysphagia immediately postoperative. Two patients have experienced a return of this complaint. They deserve special mention.

S. B., a 40-year-old female, had suffered with dysphagia for 20 years. Also she complained of severe substernal cramp-like pain; episodic in nature. There was no weight loss as she had learned to "force" food through with warm liquids. Roentgen examination revealed a distended and dilated esophagus with a stenotic area at the esophagogastric junction. There was no tortuosity or redundancy. Esophagoscopy was negative. On March 23, 1953 a modified Heller operation was carried out. She responded well and was asymptomatic for 30 days. Postoperative roentgenograms showed the narrow area open to a caliber of two cms. and free emptying of the esophagus. There was also free regurgitation from the stomach into the esophagus. She again began to experience dysphagia. She has been seen at regular intervals and continues to complain of this symptom which she states is similar to her preoperative distress. Repeated x-ray examinations have detected no retention and two fractional gastric analyses have been negative for free gastric acidity.

This patient has many other complaints of a purely functional nature, but she must be classified as an unsatisfactory result as her symptom of dysphagia has not been relieved.

TABLE IV.



A. R., a 42-year-old-male, had had achalasia for eight years. His chief problem was dysphagia followed by weight loss. There was considerable deformity of the distal esophagus as a perforation had occurred during previous dilatation. This resulted in the formation of a pseudo-diverticulum and a marked periesophageal fibrosis in the zone of narrowing. On April 19, 1950 a modified Heller operation was successfully accomplished by a transthoracic approach. Despite a stormy postoperative course because of empyema, he improved and had no difficulty with swallowing for five years. Recently when confronted with an emotional hurdle similar to the one which preceded the onset of his achalasia, he again became symptomatic. His condition has required hospitalization and relief has been obtained by bouginage.

Certainly this second patient must be classified as an unsatisfactory result, as he has required additional dilatation. While it is true that he has suffered another psychological reverse which may be responsible for the present exacerbation, it must be admitted that the vast majority of these patients go through life with repeated psychic trauma. If a therapeutic approach is to be considered successful, it must protect them from these insults.

Following the consideration of these two patients, it can be concluded that apparently lasting relief from the symptom of dysphagia or esophageal obstruction has been obtained in 94 per cent of the survivors. While the remaining 32 patients were able to eat solid foods without difficulty, a few have developed other symptoms which have been sufficiently troublesome to compromise a good result. Several of these patients have had more than one symptom.

Four patients have developed "burning pain" in the substernal region at four, eight, 14 and 18 months postoperatively. In only one of these was pain a feature in the preoperative clinical picture. In one this distress was of moderate severity and was temporary; it responded to a short medical regimen and she is now asymptomatic without therapy. The other three merit more detailed consideration.

W. K., a 47-year-old white man, had dysphagia of 9 years' duration. He had been treated by periodic dilatations. He had a history of active duodenal ulcer disease. X-ray examinations de-

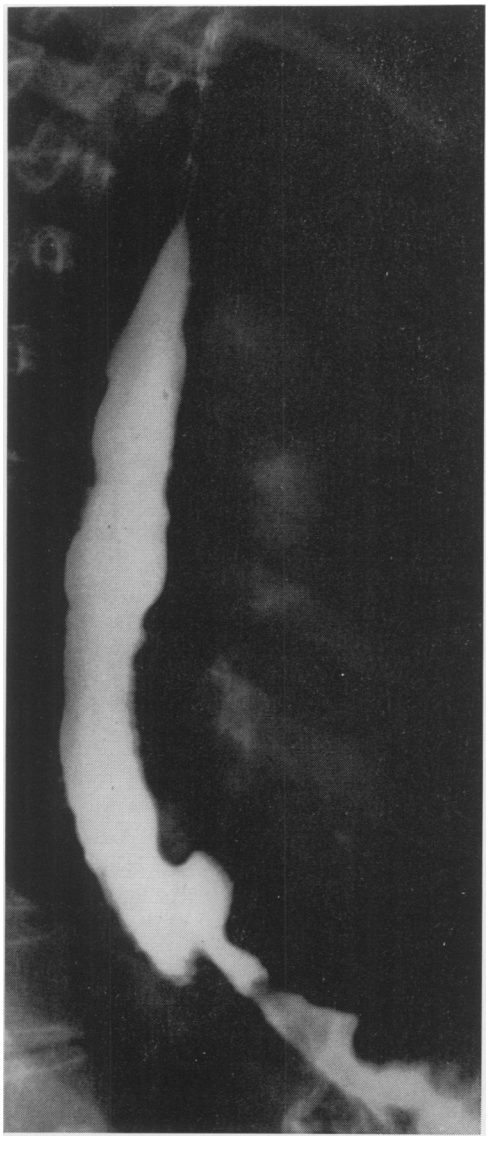


FIG. 8. Postoperative roentgenogram made eight months after Heller operation. Gastro-esophageal area is normally distensible, but there are two pseudo-diverticula of distal esophagus with an esophageal ulcer between them.

noted a moderately dilated esophagus with a conical narrowing to a stenotic zone 1 cm. in length. The dilatation of the esophagus had increased by 50 per cent over the five year period that he had been followed. On February 18, 1953 a modified Heller operation was performed, and it was noted that there was a marked degree of hypertrophy of the circular muscle layer at the gastro-esophageal junction. His early postoperative course was asymptomatic. X-ray examinations at repeated intervals demonstrated a decrease in the degree of dilatation, an opening of the terminal segment of a caliber of 1.5 cm., and rapid emptying. Also free regurgitation of stomach contents into the esophagus could be produced. Eight months after operation he developed severe substernal pain which was made worse by reclining and was more severe at night. It could be relieved by the ingestion of milk or alkali. Another x-ray of the esophagus detected the presence of two pseudodiverticula with an ulcer between them (Fig. 8). Esophagoscopy confirmed the presence of intense esophagitis with an ulceration at the esophagogastric junction. For the past 15 months, he has been on an ulcer program, and has gained 40 pounds in weight and is symptom-free at present.

R. S., a 44-year-old man, had dysphagia due to achalasia for 17 years. He had lost 40 pounds in weight. A fusiform type of dilatation of the esophagus of marked degree was apparent at x-ray examination. Esophagoscopy revealed a moderate amount of inflammatory reaction. On February 18, 1955, a Heller operation plus a pyloromyotomy was accomplished. At first he was asymptomatic and gained five pounds. Postoperative x-ray study revealed rapid emptying of the esophagus but a free regurgitation of stomach contents could be effected. After four months he developed severe substernal pain which would awaken him at night. A repeat x-ray examination demonstrated an esophageal and a duodenal ulcer. Esophagoscopy confirmed the presence of ulceration at the hiatal area. He has been placed on a strict ulcer regimen and early progress has been satisfactory.

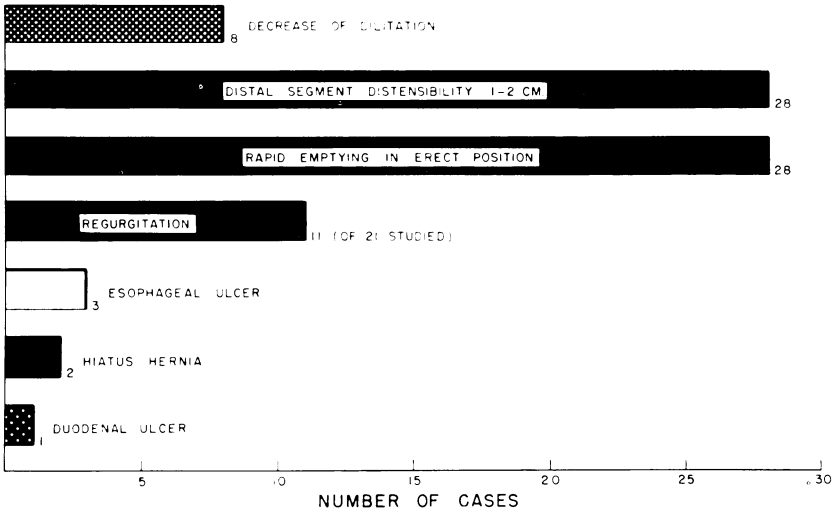
The third case, G. S., a 54-year-old woman, was admitted after 18 years of episodic burning pain in the substernal region followed by severe dysphagia. Her esophagus was markedly dilated and tortuous so that the lower portion flattened on the right leaf of the diaphragm. There was tremendous retention. On August 16, 1954, a Heller operation and a pyloromyotomy were performed. Postoperative x-ray examination revealed rapid emptying plus free regurgitation. Recently she noted a return of her severe burning pain and is now experiencing difficulty with swallowing. Esophagoscopy has not been done.

To be sure, these three patients obtained relief from dysphagia, but a new or more severe symptom eventually developed. This symptom has been alleviated in two, but only by a rigorous medical program. The

TABLE V.

RESULTS OF POST OPERATIVE X-RAY EXAMINATION

28 CASES STUDIED



result here must be regarded as unsatisfactory. It is of considerable interest that two of these four patients have had duodenal ulcer disease. Perhaps a surgical procedure which may alter the competency of the gastroesophageal sphincter would best be avoided in the patient with a peptic ulcer diathesis unless a subtotal gastric resection is also performed. Otherwise reflux peptic esophagitis may follow such an operation.

Upper gastrointestinal tract bleeding as evidenced by hematemesis, melena, and anemia has occurred in three cases. These were recorded in detail elsewhere.[6] One of these was quite mild and required no therapy.

The other two had repeated episodes of bleeding requiring hospitalization, transfusion therapy and secondary operative procedures. One was finally relieved of this complication following a subtotal gastric resection. This was carried out because of evidence of marked gastric retention on repeated examinations. He had developed a reflux esophagitis in spite of the fact that there was no free gastric acidity. The other patient had x-ray evidence of an esophageal ulcer; and a repeat examination showed partial healing of this defect. Esophagoscopy was performed to confirm this and a large carcinoma was found in the mid-thoracic esophagus. This lesion was non-resectable, and the patient died. At necropsy a large healed esophageal ulcer was identified. This patient had easy reflux of stomach contents into the esophagus, and he also had no free gastric acidity.

Excluding the case with mild bleeding on one occasion and the case with moderate pain of short duration, there remain seven patients who did not obtain a good result from esophagocardiomyotomy. Conversely 27 patients or 79 per cent of those surviving the operation have had a result that is most gratifying.

Postoperative Roentgen Findings. Postoperative roentgen examinations have been made one or more times in 28 patients (Table V). Several generalizations are possible. In all studies there was rapid emptying of the barium meal when the patient was in the erect position. There was no alteration of the disorderly or in-

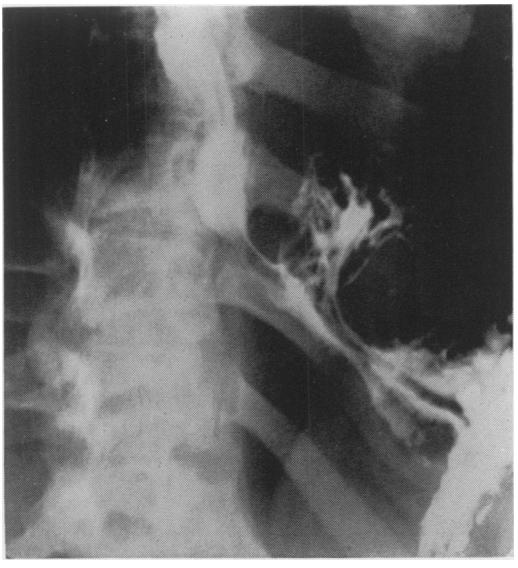


FIG. 9. Postoperative roentgenogram made two months following a Heller operation. There is a large hiatus hernia at gastro-esophageal area.

efficient peristaltic wave pattern noted in the preoperative studies except in two individuals. Both had organized, orderly waves which passed down to the gastro-esophageal junction. The constricted terminal portion of the esophagus opened to a diameter of 1.5 to 2 cms. in all patients.

A striking decrease in the caliber of the dilated esophagi has been noted in eight cases. This finding must be interpreted with caution. Usually the emptying time is so rapid that it is impossible to keep sufficient barium in the esophagus for comparison with the preoperative study.

Particular attention has been paid to the phenomenon of regurgitation of stomach contents into the esophagus. Earlier it was stated that regurgitation was rare following the Heller operation.[5] As more cases have been followed with post-operative x-ray examination, we have noted that its occurrence is not uncommon. This entity is studied by placing the patient who has a barium-filled stomach in the Trendelenburg position and having him execute the Valsalva maneuver. Of 21 patients so studied, regurgitation was established in 11, or 52 per cent.

Esophageal ulceration of the gastro-esophageal junction area was demonstrated in three patients. This was confirmed by esophagoscopy or necropsy.

Large para-esophageal hiatus hernia has been detected in two patients at the time of postoperative x-ray examination (Fig. 9 and Fig. 10). One of these has marked regurgitation. In neither was the defect demonstrated prior to operation. Both are asymptomatic. This may be the result of vigorous traction on the esophageal hiatus at the time of operation with rupture of crural fibers and enlargement of the aperture. This certainly emphasizes the importance of maintaining normal anatomic relations in this area. Should either of these patients develop difficulty with these hernias, additional surgical intervention will be indicated.

COMMENT

As this work has progressed and the courses of the patients followed after operation, we have been gratified with the excellent response manifested by four out of each five. Patients who obtain a good result experience such a marked degree of satisfaction that we have been led to speculate that the criteria for the operation should be broadened. Patients who are obtaining some degree of relief from dilatation might be considered candidates for operation earlier in the course of their disease; considered before the esophagus has become a redundant, atonic tube. Indeed, several of our most excellent symptomatic results were in cases of short duration who had had little or no prior treatment. Furthermore these people had objective evidence of improvement in the form of a return toward normal size of the esophagus. It is well to point out here, however, that esophageal motility studies[9] have shown no relationship of proportionality

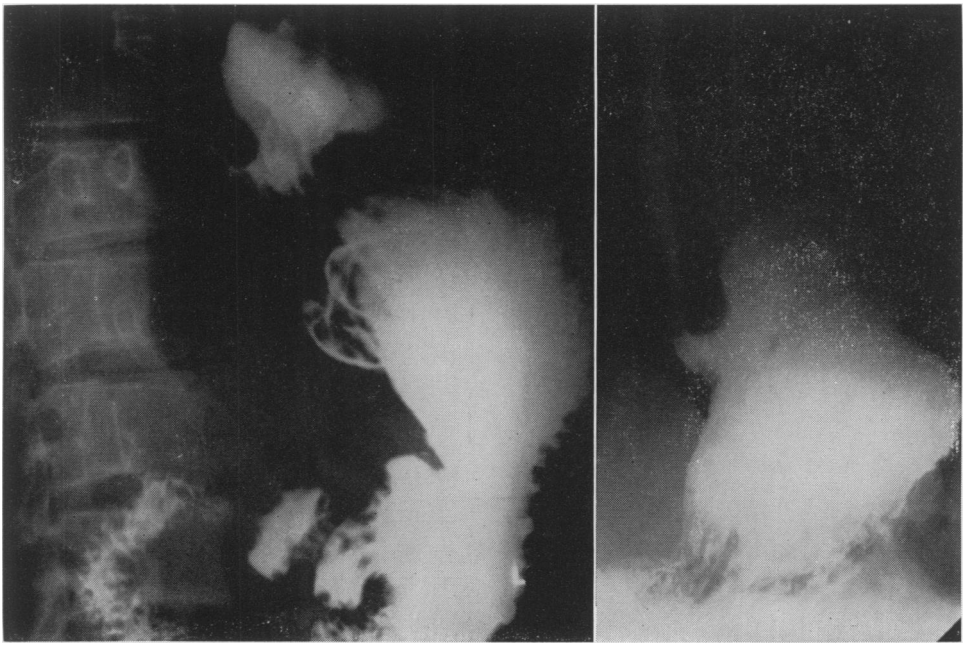


FIG. 10. Postoperative roentgen study made four months after Heller operation demonstrating the presence of a large hiatus hernia. The film on the right reveals the presence of marked regurgitation of contrast material when patient was placed in the Trendelenberg position.

between the degree of motor abnormality and the duration of the disease.

That 21 per cent did not obtain lasting relief of dysphagia or developed pain, ulceration, or bleeding has caused concern. We have been impressed by the fact that in each case in the unsatisfactory group, regurgitation of stomach contents into the esophagus could be demonstrated. While all patients who exhibit regurgitation do not get into difficulty, it must be more than chance that all who had a poor result did have this mechanism.

Our radiologic colleagues feel that many apparently normal individuals can be made to regurgitate during a barium progress meal by a number of maneuvers which increase intra-abdominal and intragastric pressure. They feel that the number in whom this factor can be demonstrated is proportionate to the perseverance and dexterity of the examiner.[11] Furthermore, the examinee often is not aware that regurgitation is taking place. Perhaps, then the development of complications is related to the degree or severity of the regurgitation.

The presence of free acid in the regurgitant material is not essential to the genesis of esophagitis. In two who developed ulceration it was present, but in two who had esophageal bleeding it was not. The possibility of concomitant pylorospasm with significant gastric retention was previously referred to.[6] This led us to consider a complementary procedure which might enhance gastric emptying. Accordingly, we have performed a pyloromyotomy at the time of the Heller procedure in the last eight cases. In the light of the recent work of Dragstedt and his co-workers,[2] this thesis of pylorospasm producing esophagitis or gastritis is a rational one.

Our total experience with this addition is yet small, but it should be noted that in two of the eight, postoperative sequelae have developed which place them in the unsatisfactory category. Though this is a

small number from which to draw conclusions, it is obvious that this is about the same proportion of poor results as obtain in the entire series.

Information gathered in the preoperative investigations of the composite series has been surveyed to see if any factors which might be used to predict a poor surgical result are present. Only two stand out. The first is the presence of esophagitis prior to operation. As before stated, of the three patients demonstrated to have esophagitis, two developed postoperative esophageal ulceration. The second point is the role of duodenal ulcer disease in the development of untoward complications following an esophagocardiomyotomy. Three of the group have had active duodenal ulceration, and two of these developed postoperative esophageal ulceration. Certainly any operative procedure which may result in incompetency of the cardia and regurgitation into the esophagus should be approached with caution in this type of case. Further experience may indicate that operation for achalasia should be avoided in this group, or that a gastric resection should be done at the same time.

A final point of interest has been the investigation of the physiologic basis for the good results which have been obtained. The manner in which esophagocardiomyotomy relieves these patients of their functional obstruction has not been entirely established. In an effort to clarify this, manometric studies of intraluminal pressures in the esophagus and tracings of the motility patterns have been carried out in 16 patients. These studies have been described in detail elsewhere.[9] Briefly, they have indicated as has the x-ray examination, that the entire esophagus is involved in this lesion. There is an arrhythmia of peristaltic activity and a marked decrease in the frequency and amplitude of the contractions. This is usually more marked at the distal end. following esophagocardiomyotomy, there is no alteration of this disturbed pattern.

This has caused us to conclude that the effect of the operation is a purely local one which serves to eliminate spasm at the gastroesophageal junction and thereby relieves the functional obstruction. Exactly how this spasm is eliminated is not clear. It has been hypothecated that the resulting scar of the myotomy actually interrupts "circus movement" of the neural impulses and thus releases the tetanic contraction.

There is no question that, in our hands, the operation of esophagocardiomyotomy has been of greater benefit to a larger number of patients than operative procedures we previously utilized. The long term result in a few is marred by the development of sequelae probably due to regurgitant esophagitis. It is hoped that additional experience and followup observations will enable us to single out the case who will not achieve complete freedom of distress. For the others, we contend that an earlier resort to surgery not only will hasten their return to comfort, but will interrupt the pathologic process before marked dilatation and fibrosis of the esophageal wall has occurred.

SUMMARY

1. An experience with 35 patients with achalasia of the esophagus treated by esophagocardiomyotomy has been reviewed.

2. Followup studies including roentgen examinations and/or manometric studies of esophageal motility have revealed that an excellent result was obtained in four-fifths of the group.

3. Recurrent dysphagia, appearance of substernal pain, or gastro-intestinal bleeding has occurred in 21 per cent. In each case in which the surgical result was unsatisfactory, regurgitation of gastric contents into the esophagus was demonstrated.

4. The addition of pyloromyotomy has failed to protect these patients from regurgitant esophagitis.

5. The presence of esophagitis preoperatively or the presence of duodenal ulcer disease appears to affect the result adversely.

6. The physiological basis for the good results is not clear. It seems that benefit is obtained by breaking the "circus movement" and eliminating spasm at the distal end of the esophagus rather than by any change in the esophageal motility.

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DISCUSSION.—DR. WILLIAM M. TUTTLE, Detroit, Michigan: Gentlemen, I feel sometimes that anything which is done to the esophagus from the surgical standpoint is probably wrong. However, in view of the fact that swallowing is an important function, we must still, as surgeons, endeavor to preserve it.

It has been our experience in all cases of Achalasia that there has been marked thickening of the msucular layer at the cardio-esophageal junction. No studies have been made of the various nerve plexuses which occur in these areas but it is our feeling that this disease is quite similar to pyloric stenosis which is seen in children.

Recently, we have treated this by an anterior Heller operation but have modified Heller's operation by sewing the muscular layer of the esophagus to the serosa of the stomach, thereby giving a valve-like result which, we feel, has prevented regurgitation. Twenty-one patients have been operated upon and there has been no regurgitation in 19.

DR. OWEN H. WANGENSTEEN, Minneapolis, Minnesota: Some of you may recall that I presented a paper to this organization five years ago upon the subject of esophageal achalasia, at which time I described complete excision of the acid-secreting area together with the lower 7 to 10 cm. of the dilated esophagus (Annals of Surgery, 134: 301, 1951). The predominant opinion at the time of my earlier presentation rather favored the idea of a return to the extramucosal cardiomyotomy of Heller.

Following that meeting, I performed the Heller procedure upon two patients. I was unhappy with the observed results because I found, as Mr. Barrett of St. Thomas Hospital in London reported, that the esophagus did not empty well following the Heller procedure. Some of you may recall Mr. Barrett's remark that failure of the esophagus to evacuate barium directly upon ingestion was a circumstance, interesting only to the roentgenologist. As a surgeon, however, I must confess that retention of barium for many hours following its ingestion after the Heller myotomy is an occurrence of more than passing interest to me. Moreover, it is, I feel, a circumstance of interest as well as of some importance to the patient.

It contemplating why the esophagus did not empty completely and directly following the Heller procedure, I thought that a more complete myotomy should be done to note whether the emptying of the esophagus would be improved. The plan I designed entailed the performance of a conventional anterior Heller myotomy, augmenting the rupture of muscle fibers with employment of a balloon.