

Evaluation of Operative Procedures for Achalasia *

McH. S. BREWER, M.D., W. A. BARNES, M.D., S. F. REDO, M.D.

New York, N. Y.

From the Department of Surgery of the Cornell University Medical College and the New York Hospital, New York City

INTRODUCTION

THE NUMEROUS METHODS advocated for the management of patients with achalasia (cardiospasm) indicate that no one method has proven entirely satisfactory. Diet and drug therapy have been of little value. The judicious use of esophageal dilators has given good results in many patients but for others this method has not been helpful.

Among the surgical procedures that have been used in the treatment of achalasia are: 1. A longitudinal incision through the esophago-gastric region with transverse closure (Heineke-Mikulicz cardioplasty). 2. A "U" shaped incision from the esophagus to the cardia across the esophago-gastric junction with closure forming a wide esophago-gastric anastomosis (Hegrovsky-Grondahl cardioplasty). 3. Resection of the lower esophagus and the adjacent portion or the greater part of the stomach with esophago-gastrostomy or esophago-antrostomy. 4. A longitudinal incision through the muscular wall of the lower esophagus and proximal stomach preserving the mucosa intact (Heller cardiomyotomy). 5. Resection of the esophagogastric junction with esophago-jejunostomy in Roux-Y fashion and preservation of most of the stomach.

In 1948, Gill and Child, from this clinic, reported the treatment of eight cases of achalasia by the Heineke-Mikulicz or Hegrovsky-Grondahl procedures.⁷ The immediate results, both subjective and objective were good. Dysphagia was relieved or greatly improved and x-ray examinations disclosed that the dilated esophagus re-

turned toward normal in size. A review of the status of these patients up to 11 years after cardioplasty was made recently and the poor late results in five of the eight cases prompted the present study.

MATERIAL

The records of 89 patients with achalasia admitted to the New York Hospital were reviewed. Most of these patients, and an additional indeterminate number of outpatients, had been treated by drugs (e.g. belladonna) and/or dilatation. The results of this therapy could not be evaluated because follow up studies were inadequate or the patients did not complete treatment, suggesting that the outcome may have been unsatisfactory in many cases. Thirty (34%) of the 89 patients with achalasia who were admitted to the hospital underwent operation.

RESULTS

In Table I are listed the pertinent data on patients subjected to various operative procedures for achalasia. The first eight patients are those reported by Gill and Child in 1948, seven of whom underwent the Hegrovsky-Grondahl procedure and one (No. 6) the Heineke-Mikulicz operation. While the immediate results were generally satisfactory, only one patient was doing well five years after operation. Two patients (Nos. 3 and 4) had retrosternal or epigastric discomfort and regurgitation, and in the remaining five reoperation was required. A second Hegrovsky-Grondahl procedure was done in patient No. 2, eight months after the original operation. Occa-

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TABLE I. Data on Patients Subjected to Operation for Achalasia

Case Number	N. Y. Hospital Number	Sex	Age	Duration of Symptoms Before Operation	Pre-operative Dilatation of Esophagus	Date of Operation	Type of Operation	Follow up	Symptoms after Operation	Dilatation of Esophagus by X-ray (Postop.)	Function of Anastomosis by X-ray
1	388704	F	28	5 yrs.	Moderate	6-20-47	H-G	6 yrs.	Recurrent dysphagia.	Minimal	Stricture with partial obstruction Excellent
2	345435	M	19	2 yrs.	Moderate	5-6-53	E-J	2½ yrs.	Dumping, mild. No dysphagia.	None	Excellent
3	167879	M	51	30 yrs.	Marked	6-11-43 2-23-44	H-G H-G	8 mos. 11 yrs.	Dysphagia, vomiting. Occasional retrosternal discomfort. No vomiting. Occasional retrosternal discomfort and regurgitation. Has symptomatic duodenal ulcer.	Marked Slight (7 yrs. postop.) Moderate	Poor Excellent without reflux Slight delay with distal esophagitis
4	206158	F	51	4 yrs.	Minimal	8-21-47	H-G	7 yrs.	Occasional epigastric pain and vomiting. Doing well in 1952. Detailed follow-up not available.	None	Excellent—has hiatus hernia
5	466970	F	25	6 yrs.	Moderate	1-29-47	H-G	5 yrs.	Dysphagia and regurgitation.	No x-rays postoper.	—
6	483521	M	34	5 yrs.	Marked	7-30-47	H-M	5 yrs.	Dysphagia and regurgitation. Moderate dumping.	Marked	Marked stenosis
7	467001	F	24	5 yrs.	Moderate	9-22-52	E-J	2 yrs.	No dysphagia or regurgitation.	No x-rays postoper.	—
8	404150	F	59	19 yrs.	Moderate	3-5-47	H-G	6 yrs.	Good result for 2 yrs., then dysphagia and regurgitation.	None	Good with reflux
9	436637	F	58	4 yrs.	Marked	2-26-53	E-J	1½ yrs.	Mild dumping. No dysphagia.	None	Good
10	524813	F	33	5 yrs.	Marked	2-7-45	H-G	3 yrs.	Unchanged. Dysphagia and regurgitation.	Marked	Excellent
11	546288	F	62	3 yrs.	Marked	8-16-48	H-G	4 yrs.	Letter from patient in 1952 reported much improvement. She must eat in small amounts. Cured of dysphagia and vomiting.	No x-rays postoper.	—
12	594754	M	26	2 yrs.	Moderate	1-13-50	H-M	5½ yrs.	Gradual return of dysphagia and regurgitation.	Minimal	Excellent
13	479167	F	49	8 yrs.	Moderate	11-12-48	H-G	5½ yrs.	Recurrence of vomiting. (Lost to follow up.)	Slight	Moderate delay
14	578690	F	54	4 yrs.	Moderate	11-15-51	E-J	9 mos.	Asymptomatic. Doing well but detailed follow up not available. Improved. Still some dysphagia with occasional regurgitation.	Moderate	Stenosis

Notes to Table I. Cases No. 1 to 8 inclusive were previously reported by Gill and Child. G-J—gastro-jejunosomy. E-J—esophago-jejunosomy. H-G—Heygrovsy-Grondahl. H-M—Heinecke-Mickulicz.

TABLE I. *Continued*

Case Number	N. Y. Hospital Number	Sex	Age	Duration of Symptoms Before Operation	Pre-operative Dilatation of Esophagus	Date of Operation	Type of Operation	Follow up	Symptoms after Operation	Dilatation of Esophagus by X-ray (Postop.)	Function of Anastomosis by X-ray
15	494711	F	38	2½ yrs.	Moderate	11-25-47	H-G	4 yrs.	Incomplete follow up. Was "doing well" in 1951. Improved slightly, but still has moderately dysphagia and regurgitation.	No x-rays postoper.	—
16	677118	F	63	37 yrs.	Marked	3-23-54	H-M	1½ yrs.	Vomiting lessened, dysphagia persisted. Asymptomatic.	Marked	Moderate delay
17	656983	M	44	36 yrs.	Marked	1920	G-J	2½ yrs. 2 yrs.	Cured of dysphagia and regurgitation.	Marked	Excellent
18	599117	F	52	2½ yrs.	Moderate	5-29-53 8-4-53	E-J Heller	7 mos.	Died with cancer of stomach 7 mos. postoper. at another hospital. Markedly improved. No dysphagia. Occasional hiccoughs.	Minimal	Considerable delay
19	627571	F	63	1 mon.	Marked	5-7-52	Heller	2 yrs.	Cured of dysphagia and regurgitation.	Minimal	Excellent
20	650785	F	26	2 yrs.	Moderate	10-6-53	Heller	2½ yrs. 1 mon.	No follow up since then. No dysphagia or regurgitation. Died of advanced pulmonary disease 2½ yrs. postop.	None	Excellent
21	657683	M	37	6 yrs.	Moderate	6-3-53	Heller	2½ yrs.	No improvement in dysphagia and regurgitation.	Moderate.	Slight delay—prior to death
22	599726	M	51	9 mos.	Marked	6-14-51	Heller	6 mos.	No improvement. No improvement.	Postmortem: marked dilatation of esophagus. Microscopically: leukoplakia of esophagus; hypertrophied muscularis	Moderate delay
23	630337	M	61	8 yrs.	Marked	6-26-52	Heller	6 mos.	Relieved completely of dysphagia and regurgitation.	Moderate	Moderate delay
24	230828	F	56	15 yrs.	Moderate	6-18-53	Heller	1 yr. 6 mos.	Slight post-prandial burning in epigastrium. Asymptomatic at one month postop.	Minimal to moderate	Excellent
25	685449	F	24	5 yrs.	Moderate	6-11-54	Heller	8 mos.	Asymptomatic. Too soon to evaluate.	None	Excellent
26	678742	F	36	5 yrs.	Marked	7-29-54	Heller	9 mos.	Asymptomatic.	Slight	Considerable delay
27	705477	F	36	2½ yrs.	Moderate	3-17-55	Heller	10 mos. 1½ yrs.	Asymptomatic.	Slight	Slight delay
28	279388	F	59	1½ yrs.	Marked	2-9-55	Heller	1½ yrs.	Asymptomatic.	None	Excellent
29	689191	F	64	5 mos.	Marked	8-9-54	Heller	2 wks.	Asymptomatic.	None	Excellent
30	531077	F	25	7 yrs.	Marked	11-27-55	Heller		Too soon to evaluate.	Marked	Narrowing of distal esophagus noted on esophagoscopy

TABLE II. *Summary of Results of Operations for Achalasia in 30 Patients*

Operation	Number of Patients			Results			Reoperation
	Male	Female	Total	Good*	Fair**	Poor***	
Hegrovsky-Grondahl (H-G)	2	8	10	3	2	5	2 H-G 3 E-J
Heineke-Mikulicz (H-M)	2	3	5	2	1	2	1 E-J
Esophago-Jejunostomy (Roux-Y) (E-J)	1	1	2	1	0	1	0
Heller Cardiomyotomy	3	10	13†	9	1	2	1 E-J Gastrostomy
Total	8	22	30†	15	4	10	7

* Good—completely or almost completely relieved of symptoms.

** Fair—improved but still with significant symptoms. *** Poor—little or no improvement.

† Results undetermined in one.

sional retrosternal discomfort persists. In patient No. 8 a second esophago-gastrostomy was performed at another hospital with improvement. In the other three patients (Nos. 1, 6, and 7) resection of the esophago-gastric junction with esophago-jejunosomy in Roux-Y fashion was done with excellent results.

Achalasia in four other patients was treated by the Heineke-Mikulicz procedure, in three by the Hegrovsky-Grondahl operation, and in two by resection of the esophago-gastric junction and esophago-jejunosomy in Roux-Y fashion. None of these patients has had a re-operation. The results were considered good in five, fair in one, and poor in three (Tables I and II). One patient (No. 11) subjected to esophago-jejunosomy continued to vomit after operation and has previously been reported.³ In this case an abdominal approach had been used, and it is felt that the esophagus had not been transected at a sufficiently high level.

Hence, among the 17 patients who were subjected to corrective surgical procedures at the esophago-gastric junction, 15 of a type that permitted reflux of gastric contents into the esophagus, the results were good in six, fair in three, and poor in eight. Follow up periods were from nine months to 11 years.

The Heller cardiomyotomy operation was performed in 13 patients. One of these died with carcinoma of the stomach at another hospital seven months postoperatively and the effectiveness of the operation cannot be determined. Of the remaining 12 patients, the results were good in nine, fair in one, and poor in two. However, the time elapsed since operation is too short (maximum 2 $\frac{2}{3}$ years) for adequate evaluation. In one patient (No. 26) there was no improvement following the Heller operation, and resection of the esophago-gastric junction with esophago-jejunosomy in Roux-Y fashion was done. The patient's symptoms persisted and a gastrostomy was necessary for feeding purposes.

DISCUSSION

It seems well established that reflux of gastric contents plays an important role in the production of esophagitis and its complications. Any disturbance of the normal mechanism at the esophago-gastric junction may permit reflux of gastric contents.¹ Ripley *et al.*¹¹ have called attention to the frequent occurrence of esophagitis following esophago-gastric anastomoses for conditions both malignant and benign. In a recent study in dogs of the relationship of upper gastrectomy to esophagitis, Hoag *et al.*,⁸ found that the factor that determined

the occurrence of esophagitis was whether or not the esophago-gastric junction was left intact.

Yet, despite these important considerations, esophago-gastrostomy and plastic procedures at the esophago-gastric junction are still being advocated for the treatment of certain benign lesions at this site.^{13, 5, 14}

Approximately three-quarters of the patients at the New York Hospital with achalasia in whom some operative procedure was performed that destroyed the normal sphincteric mechanism at the esophago-gastric junction developed symptoms and/or signs of esophagitis for which reflux of gastric contents was presumably responsible. In a similar group of 32 cases, Kay reported regurgitation, esophagitis and bleeding in 28 per cent.⁹

The Heller cardiomyotomy procedure gave satisfactory results in 10 of 12 cases although the follow up period is short. With this operation there should be less chance for reflux of gastric contents into the esophagus, although recent studies in dogs⁴ have shown this may occur.

Although we have not performed a pyloromyotomy in association with the Heller cardiomyotomy operation, such has been advocated. After this procedure gastric contents pass more quickly into the duodenum, and there is less likelihood of regurgitation into the esophagus. Moreover, following pyloromyotomy the alkaline duodenal contents tend to reflux into the stomach and should regurgitation occur into the esophagus, the partly neutralized gastric contents are less likely to produce severe esophagitis than unaltered gastric juice.^{6, 10}

The problems of treatment of patients who develop complications of esophagitis (e.g. stricture) are great. Resection of the involved area with esophago-gastrostomy may be followed by persistence and extension of esophagitis. Esophago-jejunostomy in Roux-Y fashion with a limb of at least 40 cm. between the esophago-jejunostomy and the jejuno-jejunostomy has yielded

satisfactory results.^{3, 2} More recently a segment of jejunum has been used to join the esophagus and stomach after resection of the esophago-gastric junction. Using this procedure in dogs, Skinner and Merendino¹² have reported that esophagitis does not occur and that inflammation in the transplanted jejunum is rare (one of 20 dogs).

SUMMARY

Late follow up studies of patients with achalasia treated by procedures at the esophago-gastric junction that permit reflux of gastric contents showed generally poor results. Esophagitis with ulceration and/or stricture formation was present in 11 of 15 (73%) of these cases.

Thirteen patients underwent the Heller myotomy procedure for achalasia. The results were good in nine (75%), fair in one, poor in two, and undetermined in another. However, the follow up period is too short for satisfactory evaluation.

Seven patients underwent secondary operations. The Hegrovsky-Grondahl procedure was done in two, with improvement in both cases except for occasional substernal discomfort. Esophago-jejunostomy in Roux-Y fashion with preservation of most of the stomach was performed in five patients. In one the result was unsatisfactory but in the other four symptoms of esophagitis or recurrent strictures have not occurred.

CONCLUSIONS

The surgical treatment of achalasia by any method that allows gastric contents to reflux into the esophagus (e.g. cardioplastic procedures and esophago-gastrostomy) is to be avoided. While immediate relief from dysphagia may be afforded by such procedures, esophagitis, with ulceration, hemorrhage or stricture will ultimately supervene in a high percentage of cases (73% of the cases presented).

The Heller procedure of esophago-cardiomyotomy has thus far proven to be the

most satisfactory surgical method for dealing with uncomplicated achalasia although in the group presented, sufficient time has not elapsed for adequate evaluation.

Stenosing lesions at the esophago-gastric junction, either primary or resulting from previous operations, may be treated satisfactorily by esophago-jejunostomy in Roux-Y fashion with retention of part or all of the stomach.

Further experimental and clinical studies are indicated to better the management of achalasia.

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