Surgical Treatment of Achalasia*

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The treatment of achalasia of the esophagus is designed to relieve the symptoms caused by lower esophageal obstruction. The two effective methods of treatment are forceful dilation and surgical operation. Neither of these procedures has any effect in restoring coordinated peristalsis to the esophagus, but attempts to prevent dysphagia caused by failure of the physiologic sphincter in the lower end of the esophagus to open in coordination with swallowing.

Dilation of the esophagus for achalasia has been practiced since Thomas Willis' dilated his patient in 1674 by means of a whale bone. Browne and McHardy* described their pneumatic bag with a mercury bougie in 1939. This has become the dilator most generally used in the patients studied in this series. The time-honored method of management of achalasia by medical measures and periodic esophageal dilation was performed in most of the patients treated in our hospital. Only nine patients underwent operation without a previous trial of dilation. A review of this plan of management has been made in an attempt to ascertain if surgical procedures should be utilized as a primary method of therapy. It has been our impression that the results of esophagocardioomyotomy have been sufficiently promising, insofar as correcting the symptomatology, that the indications for operation should be extended.

Clinical Material

A total of 73 patients seen at the Vanderbilt University Hospital and Nashville Metropolitan General Hospital who were treated for achalasia of the esophagus have been reviewed. The diagnosis was made on the basis of symptomatology, roentgenologic and motility studies.

The age range in this group of patients was from 19 to 85 years. Most of the patients were between 40 and 60 years with the average age being 50 years. As in other reported series,* women outnumbered men.

The major symptoms in this group of patients were those usually seen with achalasia. Dysphagia was present in 97 per cent of the patients. Seventy-six per cent complained of regurgitation. Weight loss was significant in 67 per cent. The average weight loss was 29 pounds, and one patient had lost as much as 94 pounds. Pain was an infrequent symptom, seen in only 13 patients (18 per cent). When present, the pain was localized in the epigastrium or lower sternal area and was frequently burning in nature. The duration of symptoms extended from a few months to as long as 50 years before treatment was initiated. The average duration of symptoms was seven and one-half years.

Patients Treated by Esophageal Dilation

Esophageal dilation was performed in 64 patients. The results obtained from dilation are seen in Fig. 1. One-third of the patients were failures of dilation and required a subsequent surgical procedure. Forty-four per cent of the group obtained a good result from dilation, and 11 per cent were judged to have a fair result. Twelve per cent have had a poor result, but because of age, other physical abnormalities or refusal of operation have not had a surgical attempt to correct their symptoms.

Included in those patients classified as poor results or in the group requiring surgery have been six patients who had perforation of the esophagus during dilation for treatment of achalasia. This constitutes 9.4 per cent of the patients undergoing dila-


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tion. These dilations have been carried out by experienced physicians. Two of the six patients died as a result of their perforation, giving a 3 per cent mortality rate for the treatment of achalasia by dilatation.

**Patients Treated by Esophagocardiomyotomy**

Twenty-two patients underwent a modified Heller procedure. No patient has had the classic anterior and posterior myotomy as originally described by Heller, but all had an anterior esophagocardiomyotomy. One-half of the group had transthoracic surgical approach and the other one-half had transabdominal incision. The results of operation are seen in Fig. 2. Seventy-seven per cent have had good result from operation, while five patients have had a poor result. Ellis has recently reported 78 per cent good or excellent results from an analysis of 96 patients undergoing esophagomyotomy for achalasia at the Mayo Clinic.

The follow-up has extended more than ten years in one-fourth of the patients and over two-thirds of this group have been followed for more than five years. There was no operative mortality in this series.

Those few patients who had poor results following a modified Heller operation for achalasia have been of interest. These patients have been critically analyzed in an attempt to ascertain the cause of their failure to achieve good result. Three patients had transabdominal approach and two a thoracic exposure for their operation. All the patients developed complications of esophagitis following operation. One patient had an associated duodenal ulcer. Following a Heller procedure, his dysphagia recurred within eight months. He had a repeat esophagocardiomyotomy with vagotomy and pyloroplasty, but has developed an esophageal stricture requiring periodic esophageal dilations. Another patient had recurrent dysphagia two months after a modified Heller operation and developed an esophageal stricture. Reoperation was performed with resection of the stricture and interposition of a jejunal segment and pyloroplasty. Of interest was an unsuspected leiomyoma in the region of the pylorus. This probably caused gastric outlet obstruction and contributed significantly to the development of esophagitis following the Heller procedure. Other reasons for failure after a Heller procedure have been development of a hiatus hernia following operation and failure to carry the myotomy high enough cephalad on the esophagus when operating through a transabdominal approach. One patient had a perforation of her esophagus at the time of diagnostic esophagoscopy and underwent immediate thoracotomy. An extensive myotomy was done at this time, but the site of esophageal perforation was not located. This patient later developed a diverticulum in the lower one-third of the esophagus. Because of con-

**RESULTS OF HELLER OPERATION**

![Figure 1](image1)

**Figures 1 and 2**

![Figure 2](image2)
continued dysphagia and esophagitis, this diverticulum was later excised. She improved somewhat, but still requires occasional esophageal dilation.

Four of the five patients with poor results from a modified Heller procedure have had reoperation. Two of these patients are now doing well. Each had resection of his esophageal stricture with vagotomy and pyloroplasty. Esophageal-gastric continuity was re-established in one patient by an interposed jejunal segment, and the other patient had esophagogastrectomy. The other two patients and the patient who has not had a second operation are still requiring periodic esophageal dilations.

Discussion

Many different surgical procedures have been utilized in past years for the treatment of achalasia. An excellent description of these various operations along with an historical review has been written by Steichen, Heller and Ravitch. Only the modified Heller procedure or anterior esophagocardioomyotomy is in general use at this time.

Although the results of anterior esophagocardioomyotomy have been good in almost 80 per cent of the patients, a few patients have had a poor result. An analysis of these failures in our series reveals that they have generally been due to esophagitis developing after operation. Concomitant pyloroplasty has been advocated to prevent this complication. This would seem to have been worthwhile in two of our patients with poor results. One patient had associated duodenal ulcer which may have contributed to the development of his esophagitis. The surgeon should be hesitant to utilize any operation that may cause incompetence of the cardia and regurgitation in a patient who has hypersecretion of gastric acid. Such a patient should have vagotomy and pyloroplasty or vagotomy and antrectomy at the time of the esophagocardioomyotomy. The patient with partial gastric outlet obstruction from a leiomyoma in the pyloric region would have benefited from pyloroplasty. Except for these two patients, however, there is no evidence that pyloroplasty would have been advantageous.

Controversy exists regarding whether esophagomyotomy is better performed through a transabdominal or transthoracic approach. In this series, each incision was utilized in one-half of the group. The thoracic incision is performed unless there is an associated intraabdominal problem which can be corrected at the same operation. The thoracic incision gives excellent exposure to the distal esophagus, which is responsible for the patient's dysphagia. Failure to extend the myotomy incision proximally or distally over the dilated esophagus resulted in a poor response in one patient who had a transabdominal approach. The incision distally needs to extend over the stomach only far enough to expose gastric mucosa. When utilizing the abdominal approach, there is a tendency to overextend the myotomy onto the stomach. Such a long distal incision should be avoided, as it tends to weaken gastroesophageal competence. McKee, Schlegel and Ellis have shown that radical incision on the gastric side does not lower the sphincteric pressure barrier any more than does a short esophagomyotomy, but does predispose to reflux esophagitis.

Postoperative development of hiatal hernia has been mentioned by Frohse, Stein and Hawthorne as one of the main reasons for poor results after a Heller procedure. This occurred in one of the patients in this series who developed reflux esophagitis following myotomy. Attention should be directed toward preventing injury to the esophageal hiatus and reapproximating the diaphragmatic crus behind the esophagus following esophagotomy.

The management of those few patients who have had poor results after operation has been difficult. Reflux esophagitis frequently results in an esophageal stricture. Dilation has seldom been an effective solution to this problem. Repeat esophagomyotomy has been tried, but usually is not effective because of mucosal scarring and stricture. This situation may require resection of the strictured terminal esophagus.
with esophagogastrostomy, vagotomy and pyloroplasty. An interposition operation may also be effective, but has been accompanied by a higher mortality and morbidity rate and is not necessary in most patients.

Because of the generally good results from the modified Heller operation, there is need to re-evaluate the indications for esophagocardioomyotomy in the treatment of achalasia. Most of the patients undergoing operation in this series were failures of previous attempts at forceful dilation. Obviously, patients should have myotomy early before development of a huge, atomic esophagus. Those patients who first present with a large, dilated, sigmoid-shaped esophagus are an indication for a surgical procedure as dilation may be very dangerous in these cases. Patients with associated lesions as hiatal hernia, esophageal diverticulum, duodenal ulcer, suspected esophageal carcinoma or severe aspiration pneumonia are also candidates for surgical treatment. The high percentage of esophageal perforations from forceful dilations (9.4 per cent in this series) and the absence of mortality with esophagomyotomy have influenced us to employ the modified Heller procedure as the primary treatment for more and more patients with achalasia.

**SUMMARY**

Seventy-three patients treated for achalasia have been reviewed. Forty-four per cent of those treated by forceful esophageal dilation had a good result, but esophageal perforation during dilation occurred in 9.4 per cent with an over-all 3 per cent mortality rate. In contrast, almost 80 per cent of the patients who had a modified Heller procedure were judged to have a good result. There was no mortality after this operation.

Those few who had dysphagia after esophagomyotomy have been critically analyzed. The reasons for failure and additional technics to help prevent postoperative reflux esophagitis are discussed.

The indications for the surgical treatment of achalasia need to be re-evaluated. When properly performed, esophagomyotomy is safe, effective treatment for achalasia and deserves consideration as a primary method of therapy in selected patients.

**RESUMEN**

Setenta y tres casos de acalasia han sido revisados. En 44% de los tratados por dilatación forzada del esófago se obtuvieron buenos resultados, pero hubo un 9.4% de perforaciones del esófago durante la dilatación, con una mortalidad de conjunto de un 3%. En contraste, en 80% de los pacientes que fueron tratados por el proceder de Heller modificado, se obtuvieron buenos resultados. No hubo mortalidad alguna en estos casos.

Los pocos que tuvieron disfagia después de la esofagotomía han sido revisados con sentido crítico. Las razones del fracaso y las medidas adicionales a tomar para prevenir la esofagitis de refluo post operatoria son analizadas. Precisa revalorar las indicaciones del tratamiento quirúrgico de la acalasia. Bien practicada la esofagomiotomía es segura, efectiva y merece ser considerada como un procedimiento primario en el tratamiento de la acalasia en pacientes seleccionados.

**RESUMÉ**

L'auteur a passé en revue 73 malades qui ont été traités pour "achalasie". 44 pour cent de ceux qui ont été traités par une dilatation oesophagienne forcée ont obtenu un bon résultat. Toutefois une perforation oesophagienne au cours de la dilatation survient dans 9,4 pour cent avec un taux de mortalité de 3 pour cent. A l'opposé, 80 pour cent des malades qui ont été opérés par le procédé de Heller modifié ont été considérés comme ayant un bon résultat. Il n'y eut pas de mortalité post-opératoire.

L'auteur a fait une analyse critique des quelques malades qui furent atteints de dysphagie par oesophagomyotomie. L'auteur discute les raisons des échecs et l'apport de techniques ajoutées pour empêcher un reflux oesophagien post-opératoire. Il faut de nouveau estimer les indications du traitement chirurgical de "l'achalasie". Quand l'oesophagomyotomie est pratiquée comme il convient, il s'agit d'une opération sure et efficace dans le traitement de "l'achalasie". Elle doit être prise en considération comme la méthode à utiliser d'embîée chez certains malades sélectionnés.

**ZUSAMMENFASSUNG**

Bericht über 73 Patienten, die wegen eines Mageneingangskrampfes behandelt wurden. 44% von ihnen wurden durch forcierte Speiseröhren-Dilatation behandelt und hatten ein gutes Ergebnis. Jedoch ereignete sich eine Speiseröhren-Perforation während der Dilatation in 9,4% mit einer Gesamtmortalität von 3%. Im Gegensatz dazu wurden fast 80% von den Patienten, die


References

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TREATMENT OF EMPYEMA FOLLOWING PULMONARY RESECTION

The authors present a detailed study of 71 cases of empyema which developed following pulmonary resections on the Thoracic Surgery Service at Laennec Hospital, Paris, between 1957 and 1964. In 195 total pneumonectomies performed, there were 28 or 18.5 per cent empyemas, 20 in patients resected for bronchogenic carcinoma, six for tuberculosis and two miscellaneous. In 498 partial pulmonary resections performed, there were 43 or 8.6 per cent empyemas, 23 in patients resected for tuberculosis, seven for bronchogenic carcinoma and 13 miscellaneous. There were 20 bronchopleural fistulae in the first group and 19 in the second. The authors' treatment of choice was aspiration by thoracentesis or thoracotomy, and irrigation with appropriate antibiotics and they recommended avoidance of the complication by careful preoperative and postoperative care and strict surgical technique.


KARTAGENER'S SYNDROME AND THE ETIOPATHOLOGY OF IDIOPATHIC BRONCHIECTASIS

Although Grawitz in 1880 first reported a case with dextrocardia associated with bronchiectasis, it was not until 1933 that Kartagener first fully described the association of situs inversus, bronchiectasis and sinusitis. Since that time, about 370 additional cases have been reported. In this paper a familial case is presented with special emphasis on the etiopathogenesis of the syndrome. It is postulated that bronchiectasis in this syndrome is most probably due to a dysfunction of the autonomous nervous system. This anomaly is associated with maldevelopment of the bones in the skull, cholesteotomae, etc., a complex which the authors call a "status genetico." A review of the literature is included.