

Leading article

To dilate or to operate? That is the question

In this issue Fellows *et al* report their experience with pneumatic dilatation in the treatment of achalasia of the cardia. Their conclusion that pneumatic dilatation is safe and effective and should be the initial treatment for all patients with achalasia may seem provocative to some surgeons, and warrants comment.

Present treatment of achalasia and related motor disorders of the oesophagus is at best palliative. Most symptoms and complications of achalasia are because of retention of food and fluid in the oesophagus as a result of defective relaxation of an often hypertensive lower oesophageal sphincter, together perhaps with loss of propulsive peristaltic contractions. Palliative treatment aims therefore at improving oesophageal emptying by decreasing the resistance at the cardia sufficiently to allow easy aboral flow, but insufficiently to favour gastro-oesophageal reflux. Several methods are available to diminish the resistance at the cardia: drugs, forceful dilatation, and cardiomyotomy with, or without an antireflux procedure.

DRUGS

Various drugs such as anticholinergics, glyceryltrinitrate, α -adrenergic blocking agents, and calcium entry blockers have been tried, but only the latter seem to have a role. Nifedipine has been shown to reduce the lower oesophageal sphincter pressure significantly for more than one hour.^{1 2} When administered sublingually in a dose of 10-20 mg before each meal, it produced good or excellent results in 72.4% of patients with mild or moderate achalasia.¹ If these results can be confirmed, it may be tempting to try this treatment in selected cases, because it is not likely to induce a significant degree of gastro-oesophageal reflux. On the other hand, most people do not like the idea that they will have to open their lower oesophageal sphincter artificially whenever they want to have a meal, or a drink. Diltiazem, another calcium entry blocker, seems to be promising for the treatment of diffuse oesophageal spasm.³

SURGICAL PROCEDURES

Effective and lasting decrease of the resistance at the cardia can be achieved by either surgery or forceful dilatation.

Three types of surgical procedures are advocated. Cardiomyotomy was the procedure of choice for many years. The length of the incision on the gastric side varies from a few millimetres to several centimetres. Ellis⁴ has repeatedly insisted that an incision extending more than a few millimetres on the gastric side leads to reflux oesophagitis, but this is a controversial point.

The late results of the Heller myotomy are excellent to good in 65% to 85% of the patients (Table 1). The most important early complication of myotomy is inadvertent incision of the mucosa, which occurred in about 14% of 552 cases collected from the literature,^{12 13} and resulted in empyema in 2%. Persistent dysphagia after cardiomyotomy is due to incomplete section of the circular muscle, or to reflux oesophagitis and peptic stricture: the major late complications of Heller's myotomy. The incidence of reflux oesophagitis after cardiomyotomy ranges from 3% to 52% and occurred in 10% of 1045 cases collected from 16 published papers.¹⁴ Peptic stenosis was recorded in 3.4% of these cases. The incidence of these complications increases with the duration of the follow up period. In the series of Barker and Franklin⁸ the incidence of reflux oesophagitis increased from one of 30 patients followed for one year to five of 14 patients followed for more than 10 years. Jara *et al*¹⁵ observed in a series of 121 patients an increase in reflux from 24% after one year to 52% after 13 years. Evaluation of various treatments of achalasia should therefore take into account the duration of the follow up after treatment.

The incidence of reflux oesophagitis has been sufficiently high for many surgeons to use a second type of surgical procedure and to combine the Heller myotomy with an antireflux procedure.^{7 9 12 16-20} Numerous different operations have been advocated. It is still debated whether or not an antireflux procedure should be added to the myotomy and, if one has to be added, which one is best. Excellent to good results are reported in 54% to 100% of patients treated by the combined Heller-antireflux procedure.¹⁴ As the follow up after this type of surgery is not long and the number of patients so treated not large, it is too early to draw firm conclusions on its value. Instead of a simple extramucosal myotomy a third variant has been proposed, consisting of a full thickness incision through the muscle and mucosa; the gap caused by the incision is covered by means of a Thal procedure, or with a gastric patch (cardioplasty with gastric patch).^{11 21} This procedure is used mainly in patients with advanced disease, or peptic stricture, but experience is limited.

It is hardly surprising that surgically minded endoscopists have used their

Table 1 Late results of surgery

Type of operation	Number of patients followed up	Duration of follow up (yr)	Symptomatic results (%)			
			Excellent	Good	Fair	Poor
Myotomy						
Mayo Clinic (1969, 1979) ^{4 5}	427	6, 6.5	50	35	9	6
Akuamo (1971) ⁶	84	6	53.6	17.8	16.7	11.9
Black <i>et al</i> (1976) ⁷	53	4	67.9		15.1	17
Barker, Franklin (1971) ⁸ (a)	30	1	93.3	3.3		3.3
(b)	14	10-20	35.7	28.6		35.7
Myotomy + anti-reflux						
Black <i>et al</i> (1976) ⁷ (a)	44	4	54.5		38.7	6.8
(b)	11	4	100	0		0
Ribet <i>et al</i> (1975) ⁹	45	2-10	38	41	21	
Cardioplasty with gastric patch						
Hirashima (1978) ¹⁰	55	-		90		9.1
Seta, Hatafuku (1974) ¹¹	28	7mo-7	100	0	0	0

Black *et al* (a) myotomy + anterior suture; (b) myotomy + formal repair.

cherished instrument to perform an endoscopic myotomy.²² Incision of the lower oesophageal circular muscle is carried out above the Z-line, in the region of the endoscopic rosette. Optimal incision is obtained with a wire protrusion of 3 mm and a blended current of 25 Bovie units. Three to 25 months after the procedure 88% of the 17 patients had excellent to good results. Further experience is obviously needed.

FORCEFUL DILATATIONS

Good palliation may also be obtained by forceful dilatation of the cardia. The mechanism by which forceful dilatation decreases the resistance at the cardia is not well documented. We performed dilatations in normal monkeys and dogs with balloons of increasing diameter and continued the dilatations until the lower oesophageal sphincter pressure was decreased to 20% or less of the pretreatment value. On histological examination the pathologist was unable to distinguish the sphincter segments of treated animals from those of untreated controls.

Three different types of dilators are being used. (1) The Starck dilator is a mechanical device with expanding metal arms. The diameter of the dilating device is determined by manual force. (2) The most commonly used dilators consist of a single bag of fixed diameter (usually 3–3.5 cm) which is filled with water (Plummer) or air (Browne-McHardy, Rider-Moeller) under different pressures. Treatment with both these systems consists in principle of a single dilatation. Positioning of the dilator in the lower oesophageal sphincter area may be difficult when the gullet is widely dilated and sigmoid shaped. The rigidity of the Starck dilator precludes its use in such circumstances. With the technique of passing a guide wire over a previously swallowed string it is possible to dilate effectively even the most advanced achalasia,^{23 24} but this requires considerable experience in some patients. To overcome these problems, a dilator has been recently proposed with a dilating bag mounted on a flexible fibre endoscope.²⁵ (3) The progressive pneumatic dilator consists of a series of bags of increasing diameter (3–4.5 cm) which are used on successive dilations, until the criteria for effective treatment are met.²³ These include disappearance of dysphagia, substantial reduction of lower oesophageal sphincter pressure and, on fluoroscopy, rapid emptying of the oesophagus and broadening of the previously narrow distal oesophageal segment.

After a single dilatation with a hydrostatic, or pneumatic bag of a fixed diameter, most authors report on excellent to good results in about 67% of the patients, while some 18% are not improved (Table 2). Treatment by repeated dilatations with bags of progressively larger diameter yield excellent to good results in 77% of the patients, whereas 7% are not improved.

The major immediate complication of pneumatic dilatation is perforation at the lower end of the oesophagus. In our experience with some 650 patients this complication occurred in 2% of the patients. Most figures in the literature are between 1% and 5%.¹⁴ Despite widely held opinions to the contrary, treatment of perforation at the lower end of the oesophagus caused by pneumatic dilatation can be safely and effectively done by total parenteral alimentation, broad spectrum antibiotics, and continuous oesophageal aspiration.³² It is very important, however, to recognise the perforation early and to make sure that the patient does not

Table 2 Late results of forceful dilatation

Type of dilatation	Number of patients followed up	Duration of follow up (yr, mean or range)	Symptomatic results (%)			
			Excellent	Good	Fair	Poor
Single hydrostatic						
Olsen <i>et al</i> (1951) ²⁶	452	4-16	69.2			30.2
Sanderson <i>et al</i> (1970) ²⁷	313	2.5	28.2	37	16	19
Single pneumatic						
Bennett-Hendrix (1970) ²⁸	48	2.5	70		11	19
Weinbeck-Heitman (1973) ²⁹	21	3.2	42.9	38.1	9.5	9.5
Progressive-pneumatic						
Vantrappen, Hellemans (1980)	403	7.8	37.5	39.5	8.7	14.4
Kurlander <i>et al</i> (1963)	62	<1->20	34		58	8
Starck						
Haftner (1972) ³⁰	55	1-8	67	27.5		5.4
Schomacher <i>et al</i> (1977) ³¹	79	3-29	61		19	20

take anything by mouth for a few hours after the procedure. It is our policy that all pneumatically dilated patients fast for at least two hours after the dilatation. If they continue to have pain, or if they become pyrexial, they are routinely treated as if they had suffered a perforation, until proved otherwise. The most troublesome late complication of the surgical techniques, reflux oesophagitis, is rare after pneumatic dilatation and was observed in our series in less than 1% of the patients.

Fellows *et al* propose in this issue a modification of the single dilatation technique. Dilatation is carried out under general anaesthesia using fiberoptic endoscopy to introduce a guide wire into the stomach. The pneumatic bag (Rider-Moeller) is then slid over the wire until it lies at the level of the cardia, previously identified endoscopically.

The main advantage of general anaesthesia is that the dilatation is painful and that cooperation of the patient is not required, so that children and mentally handicapped can be treated. The main disadvantage is that general anaesthesia makes the procedure more complicated. In addition, all patients are submitted to the same dilating force, so that the degree of dilatation is not tailored to the needs of each patient. Moreover, we like to confirm fluoroscopically that the balloon is in, and stays in, the correct position throughout the procedure. It is very difficult to evaluate the merits and drawbacks of the different methods of forceful dilatation. Prospective controlled studies have never been done. Nor is it known which is the most important variable: the diameter of the bag, the filling pressure of the bag, the duration of the dilatation, or the number of dilatations. Published data suggest that progressive forceful dilatation yields better results than single stretching of the cardia, without increasing the risk of perforation. This is confirmed in the present paper by Fellows *et al*, good to excellent results were obtained in 63% of the patients, as compared with 77% with progressive dilatation.

WHAT TO DO: TO DILATE OR TO OPERATE?

Retrospective comparison of two different treatments has obvious limitations. There is only one prospective randomised study comparing forceful dilatation in 18 patients and oesophagomyotomy in 20 patients

with achalasia.³³ Sixty three percent of the operated patients were asymptomatic and two had mild heartburn, while 50% of the dilated patients were asymptomatic after one or more dilatations and none had heartburn. The degree of dysphagia in the symptomatic patients was more severe in the dilated than in the operated group. Acid reflux tests were positive in 31% of the operated and in 7% of the dilated patients. From this study it was concluded that surgery for achalasia used as a primary treatment is accompanied by significantly better long term results than pneumatic dilatation. This conclusion is probably valid only for the technique used by the authors and for the patients selected according to their criteria. It is, indeed, likely that partial or absent improvement was due to incomplete dilatation. In the symptomatic patients a narrow distal oesophageal segment persisted on radiological examination and manometry showed no decrease in lower oesophageal sphincter pressure. The relatively high failure rate with the technique used by these authors may be related to the very short duration of the dilatation (6 or 10 seconds) and to the use of atropine which may relax the sphincter, thus rendering the stretching less effective. In addition, the series is small, the mean follow up period is only 3.5 years and, perhaps more importantly, only patients with mild or moderate oesophageal dilatation were included in the study. We have previously shown²⁴ and Fellows *et al* now confirm that the best results are obtained in patients over the age of 45, in patients with a history of more than five years duration, and in patients with a moderately dilated gullet.

A reasoned choice between forceful dilatation and surgery must still be based on retrospective studies. The two studies that are reasonably well comparable as to the number of patients, the duration of the follow up period, morbidity and mortality, and severe late complications, are the surgical Mayo Clinic⁵ and the Leuven progressive dilatation study¹⁴ (Table 3). The number of excellent or good results is higher in the Mayo Clinic myotomy series (85% vs 77%), while early morbidity and mortality are similar. Late strictures occurred in only 0.7% of the Leuven patients, compared with 3% in the Mayo Clinic series (which is known to have an unusually low incidence of severe peptic complications after myotomy). As patients who have failed to benefit from forceful dilatation seem to respond to oesophagomyotomy as well as if they had not had previous treatment, it would seem reasonable to perform a forceful dilatation as the initial

Table 3 Comparison of myotomy and forceful dilatation

	Myotomy (Mayo Clinic)	Progressive dilatation (Leuven)
Number of patients	427	403
Duration of follow up (yr)	6; 6.5	7.8
Results (%)	85	77
Excellent or good		
Fair	9	8.7
Poor	6	14.4
Improved	94	93
Early morbidity (surgical oesophageal leak; perforation)	1	2.6
Mortality	0.21	0.17
Late stricture	3	0.7

therapy and to reserve oesophagomyotomy for those who fail to benefit from dilatation. In their paper, Fellows *et al* arrive at the same conclusion.

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References

- 1 Bortolotti M, Labo G. Clinical and manometric effects of nifedipine in patients with esophageal achalasia. *Gastroenterology* 1981; **80**: 39-44.
- 2 Blackwell JN, Holt S, Heading RC. Effect of nifedipine on oesophageal motility and gastric emptying. *Digestion* 1981; **21**: 50-6.
- 3 Silverstein BD, Kramer CA, Pope CE II. Treatment of esophageal motor disorders with a calcium-blocker, diltiazem. *Gastroenterology* 1982; **81**: 1181.
- 4 Ellis FH Jr, Olsen AM. Achalasia of the esophagus. *Major problems in clinical surgery. Vol 9.* Philadelphia-London-Toronto: W B Saunders Co, 1969.
- 5 Ohike N, Payne WS, Neufeld DM, Bernatz PE, Pairolo PC, Sanderson DR. Esophagomyotomy versus forceful dilation for achalasia of the esophagus: results in 899 patients. *Ann Thor Surg* 1979; **28**: 119-25.
- 6 Akuamoa G. Achalasia oesophagi. *Acta Chir Scand* 1971; **137**: 782-8.
- 7 Black J, Vorbach AN, Collis JL. Results of Heller's operation for achalasia of the oesophagus. The importance of hiatal repair. *Br J Surg* 1976; **63**: 949-53.
- 8 Barker JR, Franklin RH. Heller's operation for achalasia of the cardia. A study of the early and late results. *Br J Surg* 1971; **58**: 466-8.
- 9 Ribet M, Callafi R, Hamon Y. Méga-oesophage idiopathique. Résultats et séquelles de son traitement chirurgical. *Arch Fr Mal App Dig* 1975; **64**: 629-37.
- 10 Hirashima T, Sato H, Hara T *et al*. Results of esophagocardioplasty with gastric patch in the treatment of esophageal achalasia. *Ann Surg* 1978; **188**: 38-42.
- 11 Seta K, Hatafuku T. Definitive treatment of advanced achalasia with fundic patch method. *Bull Soc Int Chir* 1974; **5-6**: 456-61.
- 12 Hollender LF, Meyer Chr, Jamart J, Calderoli H. L'opération de Heller dans le traitement du mégaesophage idiopathique. *Med Chir Dig* 1977; **6**: 89-94.
- 13 Vosschulte K. L'Achalasie de l'oesophage. *Lyon Chir* 1972; **68**: 161-3.
- 14 Vantrappen G, Hellemans J. Treatment of achalasia and related motor disorders. *Gastroenterology* 1980; **79**: 144-54.
- 15 Jara FM, Toledo-Pereyra LH, Lewis JW, Magilligan DJ. Long-term results of esophagomyotomy for achalasia of esophagus. *Arch Surg* 1979; **114**: 935-6.
- 16 Effler DB, Loop FD, Groves LK, Favaloro RG. Primary surgical treatment for esophageal achalasia. *Surg Gynecol Obstet* 1971; **132**: 1057-63.
- 17 Douglas K, Nicholson F. The late results of Heller's operation for cardiospasm. *Br J Surg* 1959; **47**: 250-3.
- 18 Helsingen N Jr. Gastroesophageal reflux as a complication of the Heller operation. *Acta Chir Scand Suppl* 1966; **356B**: 96-8.
- 19 Menguy R. Management of achalasia by transabdominal cardiomyotomy and fundplication. *Surg Gynecol Obstet* 1971; **133**: 482-4.
- 20 Mansour KA, Symbas PN, Jones EL. A combined surgical approach in the management of achalasia of the esophagus. *Am Surg* 1976; **42**: 192-5.
- 21 Hatafuku T, Maki T, Thac AP. Fundic patch operation in the treatment of advanced achalasia of the oesophagus. *Surg Gynecol Obstet* 1972; **134**: 617-24.
- 22 Ortega JA, Madwieri V, Perez L. Endoscopic myotomy in the treatment of achalasia. *Gastrointestinal Endosc* 1980; **26**: 8-10.

- 23 Vantrappen G, Hellemans J, Deloof W, Valembos P, Vandenbroucke J. Treatment of achalasia with pneumatic dilatations. *Gut* 1971; **12**: 268–75.
- 24 Vantrappen G, Hellemans J. Achalasia. In: *Diseases of the esophagus*. New York, Heidelberg, Berlin: Springer-Verlag, 1974: 287–354.
- 25 Schattenmann G, Lepsien G, Weizer HF, Siewert R. Endoscopischpneumatische Dilatation (EPD) zur Behandlung der Achalasia. *Z Gastroenterol* 1980; **18**: 572–5.
- 26 Olsen AM, Harrington SW, Moersch HJ, Andersen HA. The treatment of cardiospasm: analysis of a twelve-year experience. *J Thorac Cardiovasc Surg* 1951; **22**: 164–87.
- 27 Sanderson DR, Ellis FH Jr, Olsen AM. Achalasia of the esophagus: results of therapy by dilatation. 1950–1967. *Chest* 1970; **58**: 116–21.
- 28 Bennett JR, Hendrix TR. Treatment of achalasia with pneumatic dilatation. *Mod Treat* 1970; **7**: 1217–28.
- 29 Kurlander DJ, Raskin HF, Kirsner JB, Palmer WL. Therapeutic value of the pneumatic dilator in achalasia of the esophagus: long-term results in sixty-two living patients. *Gastroenterology* 1963; **45**: 604–13.
- 30 Hafter E. Le traitement de l'achalasia du cardia par la dilatation forcée. [Abstract.] *Acta Hepatogastroenterol* 1969; **5**: A193–6.
- 31 Schomacher PH, Sanatger R, Mekki M, Lingemann B. Ergebnisse der konservativen und operativen Behandlung der Achalasia. *Med Mschr* 1977; **31**: 401–4.
- 32 Vantrappen G, Hellemans J. Achalasia. In: Bennett JR, ed. *Therapeutic endoscopy and radiology of the gut*. London: Chapman and Hall, 1981: 73–86.
- 33 Csendes A, Velasco N, Braghetto I, Hewiquez A. A prospective randomized study comparing forceful dilatation and esophagomyotomy in patients with achalasia of the esophagus. *Gastroenterology* 1981; **80**: 789–95.