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Alimentary tract and pancreas

Pneumatic dilatation in achalasia

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SUMMARY To assess the value of pneumatic dilatation of the cardia, 63 patients with achalasia have undergone a total of 107 Rider-Moeller dilatations over the last six years. There was a marked improvement in swallowing immediately after dilatation in all but two patients, there were no deaths attributable to the procedure and serious complications were rare (1·6% of patients). The first 50 cases have been followed from nine to 73 months after their initial dilatation (mean follow-up 29·7 months). Twenty nine patients (58%) have not required a further dilatation, 19 patients (38%) required between one and three further dilatations and two patients (4%) required four more dilatations. Continuing need for further dilatation was significantly greater in those patients aged under 45 years than in those aged 45 or more at the time of their initial dilatation ($p<0·001$). Cardiomyotomy was necessary in five patients (10%), because of poor response to pneumatic dilatation; all five cases were under 45 years old at their initial dilatation. Pneumatic dilatation is a safe and effective treatment for achalasia, particularly in the older patient, and in our opinion should be the initial treatment for all patients with achalasia, reserving surgical cardiomyotomy for those who do not respond to several dilatations.

Achalasia of the cardia is a disorder of oesophageal motility characterised by loss of peristalsis and failure of relaxation of the lower oesophageal sphincter on swallowing.[1] As the underlying pathophysiological defect cannot be reversed, treatment is directed towards symptomatic relief of the disorder, by disrupting the circular muscle fibres of the lower oesophageal sphincter.

This paper presents the results of treatment of 63 patients with achalasia by Rider-Moeller pneumatic dilatation,[2] using an endoscopic technique.

Methods

PATIENTS

Pneumatic dilatation of the cardia was the initial treatment in all patients referred to this unit with achalasia and none was rejected as being unfit for the procedure. Sixty three patients have undergone a total of 107 pneumatic dilatations over the last six years. There were 27 men and 23 women. Their ages at the time of their initial dilatation ranged from 13 to 85 years with a mean of 52·1 years; 14 patients were over 70 years. Three patients had previously undergone bougie dilatation and surgical cardiomyotomy had been performed on three patients, three, six, and eight years earlier, respectively.

The diagnosis of achalasia was established on clinical, radiological, and manometric grounds. The duration of symptoms before treatment ranged from seven weeks to 30 years with a mean of 54·3 months. Dysphagia was a presenting symptom in all patients, regurgitation occurred in 79% and retrosternal pain in 79%; weight loss of more than 3 kg was noted in 56% and was significantly commoner in patients aged 45 years or more (27 of 37 patients) than in those under 45 years (eight of 26) at the time of the initial dilatation ($p<0·01$). Twelve patients had other serious medical conditions; eight had ischaemic heart disease, two had cerebrovascular disease, one was a chronic schizophrenic, and one was mentally retarded.

In all patients, barium swallow showed features consistent with the diagnosis of achalasia and the oesophagus was dilated to more than 40 mm diameter in 46 patients.

Manometry was performed on 34 patients using perfused triple lumen catheters and a station pull-through technique.[3] In every patient, the lower oesophageal sphincter failed to relax normally on swallowing and in only four was partial relaxation recorded after occasional swallows. Four had

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vigorous achalasia with frequent non-propagated high amplitude contractions in the oesophageal body; three had oesophageal contractions that were sometimes propagated and 27 had no recordable peristalsis. The initial lower oesophageal sphincter pressure ranged from 8 to 38 mm Hg with a mean of 19·7 mm Hg, the normal range in our laboratory being 9 to 33 mm Hg (mean 17·7 mm Hg).

Pneumatic dilatation of the cardia was carried out under general anaesthetic using fibreoptic endoscopy. After endoscopic inspection of the oesophagus, cardia, stomach, and upper duodenum, an Eder-Puestow guide wire was passed into the stomach through the biopsy channel of the endoscope and the Rider-Moeller bag[2] was slid along the guide wire until its midpoint lay at the level of the cardia, previously identified endoscopically. The dumb-bell shaped bag was then inflated to 280 to 300 mm Hg for three minutes, deflated and removed. Endoscopy was repeated to exclude perforation of the oesophagus and obtain lower oesophageal biopsies. On virtually every occasion, some bleeding was seen at the cardia.

After treatment, patients were examined for clinical evidence of oesophageal perforation and a plain chest radiograph was obtained to exclude mediastinal emphysema. Most patients were discharged from hospital on the following day.

The first 50 patients were followed up from nine to 73 months with a mean of 29·7 months. Assessment was based upon symptomatic review at outpatient attendance. Further dilatation was performed if troublesome dysphagia recurred.

The results were analysed using the χ^2squared test with Yates' correction and log rank analysis of life-table data.[4]

Results

The immediate outcome: after treatment, all patients except two were able to swallow satisfactorily; one sustained an oesophageal perforation which was recognised endoscopically and treated surgically within an hour with an uneventful recovery, and in another, dysphagia persisted but was relieved by a second pneumatic dilatation three days later. The one oesophageal perforation in the series gave an incidence of 1·6% in terms of patients and 0·9% in terms of dilatations. One patient developed aspiration pneumonia after dilatation, progressing to a lung abscess and empyema which were managed by antibiotics, aspiration, and physiotherapy with full recovery. No problems arose in treating patients with a markedly dilated oesophagus or a previous cardiomyotomy. There were no deaths from the procedure.

Stagnant oesophagitis was noted in 10 patients at their first dilatation. After dilatation, 17 patients noted mild transient heartburn which was not a serious problem and no patient developed an oesophageal stricture after pneumatic dilatation. Thirty four patients gained over 3 kg in weight after pneumatic dilatation.

Long-term relief of dysphagia: the first 50 patients were followed for nine to 73 months from their initial dilatation. Twenty nine required a single dilatation, 19 between two and four dilatations and two patients required five dilatations (Table 1). More than one dilatation was needed more commonly in patients presenting under the age of 45 years (12 of 20 cases) than in those aged 45 years or more (9 of 30; $0{\cdot}5<p<0{\cdot}1$: Table 2). Using log rank analysis, the need for subsequent dilatation was significantly higher in the younger than the older group ($p<0{\cdot}001$: Figure).

The proportion of patients not requiring further dilatation did not fall with the passage of time in a four year period of follow-up, indicating the lasting benefit conferred by pneumatic dilatation (Table 3).

The need for further dilatation was significantly greater in patients with symptoms of less than five years' duration, compared with those who had been symptomatic for five years or more ($p<0{\cdot}05$). The need for subsequent dilatation was not related to the initial lower oesophageal sphincter pressure or to the presence of vigorous achalasia or to the diameter of the oesophagus at the initial radiological examination.

Five patients, all aged under 45 years, underwent surgical cardiomyotomy after between two and five pneumatic dilatations failed to give lasting symptomatic benefit. In four cases, this operation relieved their dysphagia although two suffered mild gastro-oesophageal reflux afterwards; the fifth patient needed a further pneumatic dilatation three months after cardiomyotomy to successfully relieve persistent dysphagia.

There were four late deaths in this group of patients; two died from ischaemic heart disease, one from cerebrovascular disease and one from a perforated sigmoid diverticulum. There were no deaths attributable to achalasia, pneumatic dilatation, or to carcinoma of the oesophagus.

Table 1 *Distribution of the number of dilatations required by 50 patients*

	Dilatations per patient (no.)				
	1	*2*	*3*	*4*	*5*
Patients (no.)	29	9	5	5	2

Table 2 *Need for subsequent dilatation compared with age at first dilatation*

	Age of patient at initial dilatation		
	Under 45	*45 or more*	*Total*
No further dilatation	8	21	29 (58%)
Further dilatation needed	7	9	16 (32%)
Cardiomyotomy	5	0	5 (10%)

Table 3 *Need for further dilatation compared with the time after initial dilatation*

	Follow-up after the initial dilatation (yr.)			
	1	*2*	*3*	*4*
Patients (no.)	46	32	14	8
No further dilatation	61·4%	59·4%	64·3%	62·5%
Further dilatation needed	34·1%	37·5%	35·7%	37·5%
Cardiomyotomy	8·7%	3·1%	0%	0%

Discussion

These findings indicate that Rider-Moeller pneumatic dilatation is a simple, safe, and beneficial form of treatment for achalasia, particularly in the older patient; in this series it gave immediate relief of dysphagia, and weight loss, which was more common in patients aged over 45 years than in those under 45 years old at presentation, was usually corrected. Morbidity was low, gastro-oesophageal reflux was a less serious problem than after cardiomyotomy,[1] and there was no mortality.

General anaesthesia for pneumatic dilatation is preferable because the procedure is otherwise very painful and the airway is protected against aspiration. It enables dilatation to be performed in children and the mentally handicapped. The pain threshold with oesophageal distension varies considerably and it seems doubtful whether the pain reaction in the unanaesthetised patient can be used as a guide to the degree of distension necessary to relieve symptoms. Although general anaesthesia carries some risk, we consider that this is justifiable, particularly as it is of short duration.

Endoscopy permits accurate placement of the Rider-Moeller bag at the cardia, without the need for fluoroscopic control,[5] and it enables other upper gastrointestinal disease, particularly carcinoma of the oesophagus to be excluded. Oesophageal perforation is detected immediately by endoscopy after pneumatic dilatation and so extravasation of barium and food into the mediastinum can be prevented and the prognosis improved.

After the initial pneumatic dilatation, the need for subsequent dilatations was assessed purely on symptomatic grounds, contrasting with other studies,[1] where manometric criteria were used for this purpose. We believe our policy to be justified by the large number of patients who obtained symptomatic relief and whose nutritional state improved

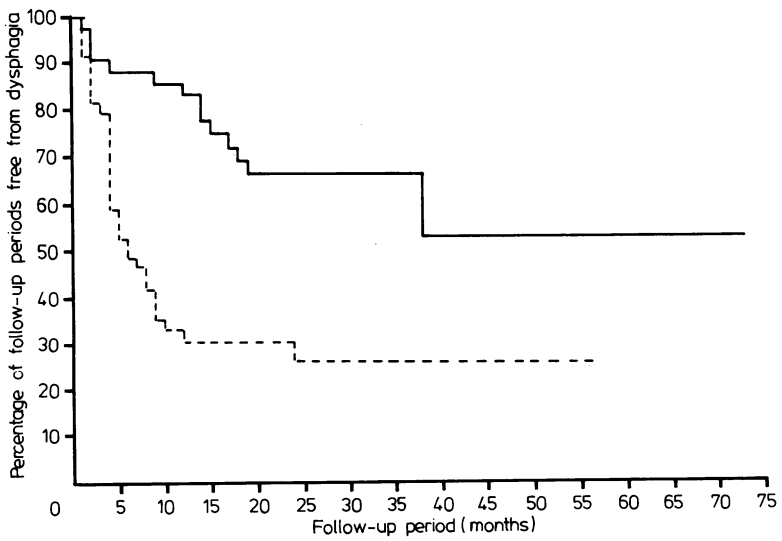

Figure *Life-table analysis of percentage of follow-up periods free from dysphagia in patients over 45 years (solid line) and those under 45 years (broken line). Two curves are significantly different ($p<0·001$).[4] It should be noted that a single patient may undergo several 'events' and therefore, this graph should be interpreted as showing a 52·9% chance that any one pneumatic dilatation will prove successful in the older age group.*

after a single dilatation.

The relative value and risk of forceful dilatation compared with surgical cardiomyotomy in the treatment of achalasia remains controversial. In a prospective randomised trial, in 38 patients, comparing the two treatments, Csendes *et al*[6] found that cardiomyotomy gave significantly better long term results. In this relatively small series, no deaths occurred but serious infection including subphrenic abscess followed cardiomyotomy in two patients. In a much larger but retrospective study from the Mayo clinic, Okike *et al*[7] found cardiomyotomy to carry a lower incidence of oesophageal leakage, a lower mortality, and a higher incidence of excellent to good results, and this was also the conclusion of Yon and Christensen[8] in a smaller retrospective study. The 4% incidence of oesophageal perforation after forceful dilatation in the Mayo series, however, was higher than that of 2·6% in the 537 patients of Vantrappen and Hellemans[1] and the 1·6% in this series; the latter figure is similar to that of 1% for oesophageal leakage after surgical cardiomyotomy in the Mayo clinic series.[7] In a review of the literature, Vantrappen and Hellemans[1] found forceful dilatation to carry a mortality of 0 to 0·79% which was smaller than the 0 to 1·4% mortality reported after cardiomyotomy and this difference was also reflected in a lower morbidity after forceful dilatation. The assessment of symptomatic relief after either procedure is difficult and lacks objectivity but we have found better relief after forceful dilatation than did the Mayo clinic group.[7]

Gastro-oesophageal reflux was not a troublesome symptom in our patients treated by pneumatic dilatation but its high incidence after cardiomyotomy[9] has led to the belief that an anti-reflux surgical procedure should be done at the same time.[10] Some hold the view that adequate relief of obstruction can only be achieved by rendering the cardia incompetent and that forceful dilatation is less effective than cardiomyotomy in both respects. If so, there is clearly a risk of causing a more serious disability than the one which is relieved and in this context, forceful dilatation might be preferred.

In Britain, pneumatic dilatation has not been popular in the management of achalasia, largely because of the fear of oesophageal perforation. In our opinion, this risk is acceptably small and dilatation should be the initial treatment in all patients, reserving surgical cardiomyotomy for those in whom lasting symptomatic relief cannot be achieved after several dilatations or in whom nutritional deficit continues. Although Castell[11] advocated surgical treatment in children and psychotic patients and in those cases where cancer could not be excluded, with our present technique, using general anaesthesia and endoscopic biopsy and cytology, none of these appear justifiable indications for cardiomyotomy. Unfortunately, there is no evidence that either forcible dilatation or cardiomyotomy reduces the small but undoubted risk of oesophageal carcinoma.

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