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ENDOSCOPE GUIDED PNEUMATIC DILATATION OF ACHALASIA CARDIA: EFFICACY, OUTCOMES AND COMPLICATIONS AT A SINGLE TERTIARY CARE CENTRE

Gastroenterology

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ABSTRACT

Introduction: Pneumatic dilation (PD) is considered to be the first line nonsurgical therapy for achalasia. The principle of the procedure is to weaken the lower esophageal sphincter by tearing its muscle fibers by generating radial force which is done endoscopically without fluoroscopic control using a low-compliance balloon such as Rigiflex dilator . It has the advantage of determining mucosal injury during the dilation process, so that a repeat endoscopy is not needed to assess the mucosal tearing.

Aim: To study the series of cases of achalasia cardia, managed by pneumatic dilatation and observe their efficacy, outcomes and complications presenting in our centre during the period of July 2015 to 2017

Methods: 27 cases of achalasia cardia which presented to our centre during July 2015 to 2017 and managed by endoscope guided pneumatic dilatation were retrospectively analysed and their outcomes were observed.

Results: 25 of 27 patients with achalasia presented with dysphagia for solids or liquids. 20 patients had regurgitation and vomiting. Weight loss of more than 5 Kg was observed in 10 patients. History of nocturnal cough was present in 7 patients. 35 dilatations were performed in 27 patients. All patients had relief of dysphagia and regurgitation within 24 hours. Barium swallow within a week of dilatation showed a decrease in the maximum diameter of the oesophagus from 42.4 + 11.4 mm to 30.5 + 10.5 mm and increase in the diameter of the narrowed lower segment from 2.45 + 1.5 mm to 11.4+ 2.2 mm. None of the patients showed a hold up of barium after dilatation. 20 patients complained of retrosternal pain during procedure but none persisted for 24 hours. No perforations were encountered during the study. There was no procedural mortality .

Conclusion: Endoscope-guided PD is an efficient and safe nonsurgical therapy with results comparable to other treatment modalities.

KEYWORDS

Achalasia cardia , Esophagus, Manometry , Pneumatic dilatation.

INTRODUCTION

Achalasia is an uncommon disorder with an annual incidence of approximately 1.6 cases per 100,000 individuals and prevalence of 10 cases per 100,000 individuals.[1] Achalasia results from progressive degeneration of ganglion cells in the myenteric plexus in the esophageal wall, leading to failure of relaxation of the lower esophageal sphincter, accompanied by a loss of peristalsis in the distal esophagus.[2]

The etiology of primary or idiopathic achalasia is unknown. Clinical symptoms include dysphagia, , heartburn, regurgitation ,chest pain and weight loss. The diagnosis is confirmed by esophageal manometry. Treatment is aimed at decreasing LES pressure to facilitate emptying of esophageal contents. This can be accomplished by either mechanical disruption of the muscle fibers of the LES with pneumatic dilation or surgical myotomy or by biochemical reduction in LES pressure with injection of botulinum toxin. Treatment aimed at mechanical disruption of the LES is generally recommended for patients at low surgical risk.[3,4]

This study aimed at evaluating the efficacy, outcomes and complications of endoscope guided pneumatic dilatation in patients with achalasia cardia

MATERIALS AND METHODS

This is a retrospective study carried out at the Institute of Medical gastroenterology, Madras medical college, Chennai, India

Patients with proven achalasia cardia [clinically/endoscopically/ barium swallow/ high-resolution manometry (HRM)] who underwent pneumatic balloon dilatation in this Department from July 2015 to July 2017 were included in the study. Patients with secondary achalasia, history of esophageal or gastric surgery and laparoscopic Heller's myotomy were excluded.

Over a period of two years (between July 2015 and July 2017), 27 cases of achalasia were identified. Clinical, endoscopic, manometric, radiological (barium esophagram) and therapeutic and data were collected.

Technique Of Pneumatic Dilatation

The patients are advised to be on a liquid diet for one or two days and to fast for at least 12 hours prior to the procedure. Prior to dilation, a thorough endoscopic examination is performed, with particular attention given to the cardia, where malignancy can simulate achalasia (called pseudoachalasia). A guidewire is then passed through the biopsy channel of the endoscope into the stomach and the scope is withdrawn to the gastroesophageal junction. The distance between the incisors and the gastroesophageal junction should be noted using the markings along the length of the scope. The endoscope is then removed, maintaining the positi`on of the guidewire in the stomach. A marker (such as paper tape) is placed on the shaft of the dilating catheter corresponding to the previously noted distance between the incisors and the gastroesophageal junction. This distance should be measured from the middle of the balloon on the dilating catheter so that, when inserted, the middle of the balloon will be positioned across the LES.

A Rigiflex balloon with 3cm diameter was used for PD . The balloon and tip of the catheter are lubricated and passed over the previously placed guidewire until the marker reaches the incisors. Under endoscopic guidance the balloon is then gradually inflated with air, noting the position of the developing "waist" in the balloon . Small adjustments usually have to be made in the position to ensure that the waist occurs at the center of the balloon . The balloon is fully inflated so that the waist is obliterated.Approximately 7 to 15 pounds per square inch (psi) of pressure is required for waist obliteration, which requires approximately 120 mL of air, the inflation is maintained for 60 seconds. After removing the balloon with guide wire in situ, the mucosal tear is assessed in the same sitting.

Patients symptoms were analysed using Eckardt symptom score both pre and post dilatation.(Table1) Timed barium esophagogram (TBE) was done prior to and one week after dilatation.Success was based on decrease in Eckardt score and completeness of emptying in TBE.

Table 1. Clinical scoring system for achalasia cardia (Eckardt score)

Score	Symptom			
	Dysphagia	Retrosternal pain	Regurgitation	Weight loss(kg)
0	None	None	None	None
1	Occasional	Occasional	Occasional	<5
2	Daily	Daily	Daily	5-10
3	Each meal	Each meal	Each meal	>10

STATISTICALANALYSIS

Data handling and analysis were performed using the SPSS 16.0 package (SPSS Inc., Chicago, IL). Continuous measurements are presented as mean ± standard deviation and categorical measurements are presented as number (%). The significance of study parameters on categorical scale between two or more groups was made by chi-square/ Fisher exact test. The significance of study parameters on continuous scale between two groups (intergroup analysis) on metric parameters was made by Student's t-test. Significance was established at $p < 0.05$.

RESULTS

The mean age of patients was 46 ± 11.54 years (23 - 75). The sex ratio was (21M:6F) . Symptoms had begun 39.8 ± 34.8 months (3 - 120 months) before diagnosis of achalasia. Dysphagia, was present in 92.59% of cases, chest pain were found in 14 cases (51.85%), food regurgitation in 20 cases (74.07%) and heartburn was noted in 13 patients (48.14%). Respiratory signs were present in 40.74% of cases, like aspiration (4 cases) and nocturnal cough in 7 cases. Weight loss of more than 10 kg was noted in 10 patients(37.03%). The endoscopy showed an appearance of dilated esophagus in 18 cases (70.37%) and esophageal stasis in 22 cases(81.48%).Manometry was showed complete aperistalsis of esophageal body in all patients (100%). The clinical characteristics of the patients are depicted in Table 2

Table 2 Characteristics of patients

Parameters	Patients (N=27)
Age (years)	46 ± 11.54
Sex (M/F)	21:6
Symptoms duration (months)	39.8 ± 34.8
Dyphagia (%)	92.59
Regurgitation (%)	74.07
Chest pain (%)	51.85
Respiratory manifestations (%)	40.74
Loss of Weight (%)	37.03
Dilated esophagus (endosopy)	70.37
Aperistalsis(manometry)	100

35 dilatations were performed in 27 patients with an average of 1.3 PD per patient. All patients had relief of dysphagia and regurgitation within 24 hours. Barium swallow within a week of dilatation showed a decrease in the maximum diameter of the oesophagus from 42.4 + 11.4 mm to 30.5 + 10.5 mm and increase in the diameter of the narrowed lower segment from 2.45 + 1.5 mm to 11.4+ 2.2 mm. None of the patients showed a hold up of barium after dilatation. Clinical effectiveness of PD was evaluated by eckardts score. Mean pre dilatation Eckardt score was 8.16 ± 0.812. Post dilatation Eckardt score at one month was 2.20 ± 1.54 which was significant ($p<0.05$) Table 3

Table 3 Study variables pre and post pneumatic dilatation

Variables	Pre dilatation	Post dilatation
Esophageal diameter(mm)	42.4 + 11.4	30.5 + 10.5
Narrowed lower segment(mm)	.45 + 1.5	11.4+ 2.2
Eckardt score	8.16 ± 0.812.	2.20 ± 1.54

DISCUSSION

Achalasia is an esophageal smooth muscle motility disorder in which the lower esophageal sphincter (LES) fails to relax. It is thought to result from a selective loss of inhibitory nitrinergic neurons (which contain nitric oxide synthase) in the myenteric plexus, resulting in relatively unopposed excitation by the cholinergic system. Achalasia is usually diagnosed in patients between the ages of 25 and 60 years. Both sexes are equally affected. The etiology of primary or idiopathic achalasia is unknown. Secondary achalasia is due to diseases that cause esophageal motor abnormalities. Dysphagia for solids and liquids and regurgitation of bland undigested food or saliva are the most frequent symptoms in patients with achalasia .Similar observations were found in various studies.[5-7]

Upper endoscopy may reveal a dilated esophagus that contains residual material, sometimes in large quantities. The appearance of the LES may range from normal to a thickened muscular ring with a rosette configuration on retroflexed view. In patients with achalasia, the LES usually opens with a snap. The esophageal mucosa usually appears normal in patients with achalasia.[8]

The manometric findings of aperistalsis and incomplete LES relaxation without evidence of a mechanical obstruction indicate the diagnosis of achalasia.[9] According to the Chicago classification, achalasia is divided into three subtypes. Type I: Absence of peristalsis, no pressurization within the esophageal body, high IRP. Type II: Absence of peristalsis, contractile activity, panesophageal pressurization >30 mm Hg, and high IRP. Type III: Absence of peristalsis, and two or more spastic contractions with or without periods of compartmentalized pressurization. Type II achalasia was the most common in our study.

A timed barium esophagram [4,10,11] was performed before and 1 month after each dilation as an objective assessment of improvement in esophageal emptying in patients undergoing PD. It can be a useful as an objective means of assessing esophageal emptying after PD.[4] In our study none of the patients showed a hold up of barium post dilatation.

Pneumatic endoscopic dilatation (PD) uses air pressures to intraluminally dilate and disrupt the circular muscle fibers of the LES. It is considered the most effective nonsurgical treatment for achalasia. The most commonly used dilator is the microinvasive Rigiflex balloon system (Boston Scientific Corp, Boston, Massachusetts, USA),available in three diameters (30, 35, and 40 mm). Accurate positioning of the Rigiflex balloon across the LES and obliteration of the balloon waist is important for effectiveness of the dilatation rather than the balloon distention time. This was confirmed endoscopically instead of fluoroscopy in our study along with the finding of mucosal tear. In our study, the successful dilatation was achieved in 89.64% by using 30 mm balloon. In a European study by Hulselmans M et al, in which serial dilatation was performed with the goal of reducing the LES pressure below 15 mm Hg, a 3-year success of 78 to 85% was reported with PD.[12] Laparoscopic Heller's myotomy has almost same success rate as that of PD but with more morbidity.[13]

The most serious complication associated with PD is esophageal perforation with an overall median rate in experienced hands of 1.9% (range 0–16%).[14] No perforations were encountered in our study. There was no post procedural mortality.

In conclusion, pneumatic balloon dilatation of achalasia cardia is highly effective modality with minimal complications and mortality. Endoscope-guided PD is an efficient and safe nonsurgical therapy with results comparable to other treatment modalities. Improvement in Eckardts score is seen even with a single session of dilatation .Though POEM is emerging as a successful treatment option for achalasia , pneumatic balloon dilatation is still the most commonly performed endoscopic procedure for achalasia, especially in developing countries, with comparable efficacy and outcomes.

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