

# Pneumatic Balloon Dilation of Achalasia Cardia

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## ABSTRACT

*Objective* To find out frequency of improvement of symptoms and complications rate following endoscopic esophageal balloon dilation in patients with achalasia cardia.

*Study design* Case series.

*Place & Duration of study* Department of Surgery Dow University of Health Sciences & Civil Hospital Karachi, from January 2006 to September 2013.

*Methodology* Patients in whom diagnosis of esophageal achalasia was made on investigations (barium swallow and / or manometry) were included. These patients were subjected to balloon dilation. The procedure was performed using Olympus achalasia balloon dilators. All patients were followed up and their responses were noted. Excellent response was defined as improvement of dysphagia for both solids and liquids. In good response category those patients were included who had improvement of dysphagia for both solids and liquids but problems with food intake persisted. In poor response category patients there was no improvement following balloon dilation. Time to recurrence of symptoms and complications were also noted.

*Results* A total of sixty patients were included. There were 31 males (51.7%) and 29 (48.3%) females. Male to female ratio was 1.07:1. The age of the patients ranged from 13 to 65 year. The mean age was  $35.48 \pm 13.36$  year. Seventy five dilations were performed (mean  $1.25 \pm 0.54$ ). In 35 (58.33%) patients excellent response was obtained while 19 (31.67%) patients had good response. In 6 (10%) patients no improvement was seen. These were put into poor response category. In one (1.7%) patient esophageal perforation occurred. In six patients (10%) surgery was advised as no improvement following multiple sessions of balloon dilation occurred.

*Conclusion* Achalasia cardia can be managed effectively with balloon dilation under fluoroscopy.

*Key words* Achalasia cardia, Pneumatic dilation, Dysphagia.

## INTRODUCTION:

Achalasia cardia is an esophageal motility disorder which is characterized by incomplete lower esophageal sphincter (LES) relaxation, increased LES tone, and lack of peristalsis of the esophagus.<sup>1-4</sup> Dysphagia, regurgitation and sometimes chest pain are common presenting

symptoms.<sup>2,3</sup> Esophageal manometry and barium swallow are done to diagnose this condition.<sup>3,4</sup>

Currently the main treatment options are endoscopic balloon dilation and laparoscopic Heller's myotomy.<sup>2,4</sup> The success rate of endoscopic and laparoscopic procedure is around 70-80% and 89-100% respectively.<sup>1,5-7</sup> The outcome of balloon dilations and surgical intervention are comparable. However balloon dilation is advantageous in terms of being minimally invasive without any surgical incision. It is cost effective with short hospital stay and minimal chance of subsequent gastro-esophageal reflux.<sup>2,8</sup> Currently either graded pneumatic dilation or surgical myotomy

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with a partial fundoplication are recommended as initial therapy for the treatment of achalasia in fit patients.<sup>9,10</sup> This study was conducted to document the results of pneumatic balloon dilation for achalasia cardia in a university hospital.

**METHODOLOGY:**

This is the retrospective analysis of all the patients who were managed at the Department of Surgery, Civil Hospital Karachi, from January 2006 to September 2013 with the diagnosis of achalasia cardia. Only those who underwent balloon dilation were included. Patients with pseudoachalasia and those who could not be contacted or followed up, were excluded. Manometric assessment of peristaltic activity and measurement of lower esophageal sphincter pressures were performed in all the patients after 2010 as the equipment and expertise became available. The balloon dilations were performed in the endoscopy suite under fluoroscopy. Midazolam and nalbuphine were administered intravenously for sedation and analgesia. Propofol was used where required. Balloons used for dilation were of Olympus Achalasia Balloon Dilator (BA-1 (30mm), BA-2 (35mm), BA-3 (40mm)). Post procedure patients were kept under observation for 6 hours and retained overnight if symptomatic.

Telephonic follow up was done where patients were asked about the improvement of dysphagia and divided into three response categories.<sup>1</sup> Excellent response was taken as improvement of dysphagia for both solids and liquids. Good response was taken as improvement of dysphagia for both solids and liquids but still there was problems in food intake while poor response was taken as no improvement following balloon dilation. Time to recurrence of symptoms in months was asked. Poor responders and those with more than 3 dilations were offered surgery. Complications like regurgitation and chest pain were also asked.

Data was collected on a proforma and entered into Linux (Ubuntu) pspire 0.7.9, a program for the analysis of sampled data. Comparison of categorical data was done by cross tabulation and Chi square test. Mean and standard deviation were computed for numeric variables. Comparison of continuous

data was done by Student t-test. A p-value <0.05 was taken as statistically significant.

**RESULTS:**

Seventy five dilations were performed in 60 patients (mean 1.25±0.541). There were 31 males (51.7%) and 29 (48.3%) females. Male to female ratio was 1.07:1. The age ranged from 13 year to 65 year, with a mean of 35.48±13.36 year. The symptoms of achalasia was dysphagia in all, regurgitation in 38 (63.3%), retro sternal pain in 14 (23.3%) and weight loss in 49 (81.7%). There were four patients who presented after esophageal surgery of achalasia. Forty-eight (80%) patients required a single dilation while twelve patients required two or more dilations. The 30mm balloon was used in 36 (60%) patients and 35 mm in 24 (40%). Details are given in table I.

Twelve (20%) patients had recurrence of symptoms following initial balloon dilation (table I, II). In patients with recurrence the next higher balloon size was used for dilation for up to 3 sessions. There were 35 (58.33%) patients with excellent response, 19 (31.67%) with good response and 6 (10%) with poor response after dilations. Two patients who required more than two dilations had a mean age of 26.5±2.12 year while ten patients who required two or less dilations had a mean age of 45±12.48 year (p=0.001). Complications of balloon dilation included perforation in one (1.7%) case, regurgitation in 8 (13.33%) and chest pain in 14 (23.33%). Six patients (10%) were referred for surgery after failure to improve after balloon dilation; of these two patients refused surgery and continued with balloon dilation.

**DISCUSSION:**

The success rate of balloon dilation varies widely in literature with some studies quoting the rate as 80-93% with less number of complications.<sup>8,11,12</sup> A study by Campos et al reported a success rate of 84.8% within one month of procedure.<sup>8</sup> The overall success rate in this study was 90% which is similar to the reported figures in literature. The dilations in the first session ranged from 30-35mm with a mean of 32±2.47. Most of the patients had good or excellent results and did not require further dilations.

**Table I: Dilations in Sessions**

| Dilatation(mm) | 1st Session (n=60) | 2nd Session (n=12) | 3rd Session (n=3) |
|----------------|--------------------|--------------------|-------------------|
| 30             | 36                 | 0                  | 0                 |
| 35             | 24                 | 5                  | 0                 |
| 40             | 0                  | 7                  | 3                 |

**Table II: Poor Responders Characteristics**

| Serial No | Sex    | Age (Year) | No. of Dilations (n) | Dilator Size (mm) |
|-----------|--------|------------|----------------------|-------------------|
| 1         | Male   | 46         | 2                    | 35,40             |
| 2         | Male   | 25         | 3                    | 35,40,40          |
| 3         | Male   | 28         | 3                    | 35,40,40          |
| 4         | Female | 50         | 2                    | 30,35             |
| 5         | Female | 21         | 2                    | 35,40             |
| 6         | Female | 65         | 2                    | 30,35             |

There were six poor responders who had two or more dilations. Studies have reported that cumulative dilation with 3.0, 3.5, and 4.0 cm balloon diameters results in good-to-excellent symptomatic relief.<sup>10,11</sup> In this study there was no fixed criteria of balloon size for initial dilation however in patients with recurrence, progressively larger balloons were used.

It has been reported in several studies that younger age responds poorly to graded balloon dilation.<sup>10,13,14</sup> This could be due to thicker lower esophageal sphincter musculature.<sup>10,15</sup> Eckardt et al advocate surgery for achalasia as the first-line treatment for patients younger than 18 year of age.<sup>15</sup> Two patients who required more than two dilations in our series had a mean age of 26.5±2.12 year while patients who required two or less dilations had a mean age of 45.86±12.48 year. However the number of patients with more than two dilations was very small and no inference can be made on this basis.

Esophageal perforation is one of the most serious complication of achalasia balloon dilation with an overall median rate in experienced hands of 1.9% (range 0 – 16).<sup>1,11,14,15</sup> Borotto et al stated that perforation are reported during the first dilation.<sup>16</sup> In this study there was one perforation following first dilation with 40mm balloon. This patient was 45 year old. He was managed with chest tube insertion and recovered. There were four patients who presented after achalasia surgery. All of them had excellent to good response to endoscopic treatment and none of them had any complication. This is in keeping with findings from the Metman et al study, in which it was found that previous Heller myotomy was not a risk factor for complications.<sup>17</sup>

The frequency of gastroesophageal reflux disease after pneumatic balloon dilation is 15–35%. In patients with persistence of symptoms of dysphagia there are chances of stricture formation at distal end of esophagus. This is a potential cause of reflux.<sup>10,14,17</sup> In our study, symptomatic gastroesophageal reflux was noted in 13.3% of patients following dilation and resolved

spontaneously on proton pump inhibitors in all cases. With balloon dilation the chances of permanent damage to lower esophageal sphincter is less when compared with surgical intervention. In surgical procedure the integrity of the phrenicoesophageal ligament is lost.

Chest pain can occur following balloon dilation.<sup>2,15</sup> It is one of the common indications for repeated admission and investigation to rule out perforation. Eckardt et al reported an occurrence of chest pain in 15% of patients between one to ten hours after pneumatic dilation.<sup>2</sup> We encountered fourteen cases (23.3%) of severe post dilation chest pain where the discharge was delayed and perforation was ruled out. All patients improved on strong analgesics.

Recurrence of symptoms is reported in 3-20% of patients. These can be treated with repeated balloon dilations.<sup>18,19</sup> In this study there were 12 (20%) patients who had recurrence. The mean time to recurrence was 7.83±6.85 months (range 1-30 months). Majority of the patients with recurrence responded to balloon dilation and only six patients continued to have symptoms after repeated dilations. In some studies it is recommended that surgery should be performed when symptoms of dysphagia recur after three sessions of pneumatic dilations.<sup>1,3,18,19</sup> The results of surgical intervention are not superior to balloon dilations. Our protocol is to repeat dilation twice. When no improvement occurs following second attempt, surgery is advised.

#### **CONCLUSIONS:**

Pneumatic balloon dilation for esophageal achalasia under fluoroscopic control was found safe. The outcome in terms of relief of symptoms was excellent to good in majority of the cases.

#### **DISCLOSURE:**

The study data was presented in a conference as a poster. This can be found in the Journal of Gastroenterology and Hepatology 2014 issue.

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