

## The Management of Achalasia with Balloon Dilation Catheter

Gontar A Siregar, Zulkhairi

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### ABSTRACT

*Achalasia is defined as a motor disorder of the esophageal smooth muscle in which the lower esophageal sphincter does not relax properly with swallowing and the normal peristalsis of the esophageal body is replaced by abnormal contractions. The definite etiology is unknown. The incident is infrequent. The diagnosis of achalasia was established by clinical, radiological investigation, and manometric data. The management of achalasia consists of conservative treatment, dilation and surgical treatment. Esophageal dilation is the technique used to stretch open the blocked portion of the esophagus. Balloon dilation is a form of definite treatment beside myotomy or Heller's operation. We hereby report a case managed by balloon dilation catheter after failure by means of conservative treatment.*

**Keywords:** achalasia, achalasia management, balloon dilation

### INTRODUCTION

Achalasia is defined as a motor disorder of the esophageal smooth muscle in which the lower esophageal sphincter does not relax properly with swallowing and the normal peristalsis of the esophageal body is replaced by abnormal contractions.<sup>1</sup>

The synonyms of achalasia are cardiospasm, aperistaltic and mega esophagus.<sup>2</sup> Ineffective control of the aurbach plexus in the distal esophagus, a general disturbance of esophageal motility, viral infection, and genetic conditions are suspected as the primary etiology, but a definite cause has not been established.<sup>1,3,4</sup>

Secondary achalasia may be caused by infection (Chagas' disease), intra luminary tumor i.e. tumor of the cardia that infiltrates the esophagus or extra luminal displacement i.e pseudocyst of pancreas.<sup>1,3</sup>

Achalasia can be divided into two types based on the changes in esophageal body; in classic achalasia, simultaneous small amplitude contractions occur, while in vigorous achalasia, contractions are simultaneous in onset, large in amplitude, and repetitive, resembling those seen in diffuse esophageal spasm.<sup>1</sup>

The incident is rare, approximately 1/200,000, mainly in adults.<sup>5</sup> Data from Cipto Mangunkusumo Hospital from 1984-1988 reported only 48 cases. Many authors found cases among middle aged individuals, inflicting males and females with the same proportion. The mortality rate is reported from 0 to 250 in 26 countries.<sup>3</sup>

The diagnosis of achalasia is established by clinical, radiological investigation and manometric data.<sup>6</sup> The differential diagnoses of achalasia are primary esophageal motility disorders and pseudoachalasia.<sup>7,8</sup>

Achalasia can be complicated by aspiration pneumonia, acute perforation, esophageal carcinoma, gastric carcinoma, and deep ulcer bleeding.<sup>4</sup>

The management of achalasia consists of conservative, dilation and surgical treatment.<sup>4</sup>

This is a case report on achalasia treated by balloon catheter dilation.

### CASE REPORT

A 56-year old woman was admitted to the Medan Haji Hospital on June 16<sup>th</sup> 2002 with a main complaint of difficulty swallowing. She had been suffering from the condition for 3 years and has had many recurrences needing admission to several hospitals. Dysphagia was followed by vomiting, chest pain and heartburn after meals. She lost about 15 kg in 6 months.

Physical examination revealed the patient to be fully conscious, with a blood pressure of 140/90 mmHg, a regular pulse rate of 84 x/minute, a regular respiratory rate of 20 x/minute, a temperature of 37.2°C. There was

*Division of Gastroentero-Hepatology, Department of Internal Medicine, School of Medicine of North Sumatera, University Medan, Indonesia*

no anemia, and the patient's skin turgor was good. She weighed 44 kg, and was 156 cm tall. No abnormality was found in physical examination. Laboratory findings were as follows: Hemoglobin level 12.5 g%, BSR 20 mm/hour I, white blood cell count 4600/mm<sup>3</sup>, differential white blood cell count: 1/0/2/65/28/4, hematocryte 37.4%, platelet count 253,000/mm<sup>3</sup>, AST 47 U/L, ALT 18 U/L, Ureum level 26.2 mg%, Creatinine level 20.3 mg%. Urinalysis was normal.

Gastric duodenal barium meal x-ray demonstrated (1) Dilatation of esophagus and narrowing of the distal esophagus which could be due to achalasia. Gastroscopy revealed achalasia. We diagnosed the patient with achalasia, and decided to manage her conservatively with a liquid diet and intravenous fluid, 3 x 10 mg of nifedipine before meals, and 40 mg iv/daily Omeprazole. We did not perform dilation using a simple bougie dilator because patient refused. We then decided to perform achalasia dilation using the rigiflex balloon dilation catheter. At her first control visit, the patient had no complaint in swallowing and demonstrated weight gain.

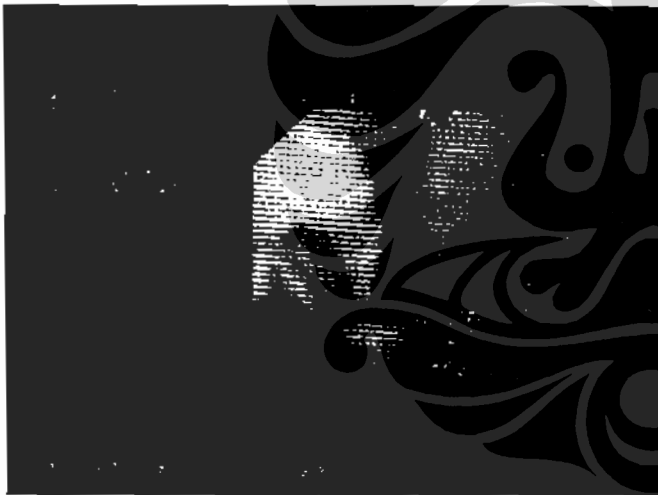


Figure 1. Endoscopy of 56 Year-old Female Patient S, Demonstrating Achalasia

## DISCUSSION

Achalasia is an uncommon motility disorder of the esophagus (swallowing tube).<sup>9</sup> Achalasia is a well recognized primary esophageal motor disorder of unknown etiology. Available data suggest hereditary, degenerative, autoimmune and infectious factors as possible causes for achalasia, the latter two being the most commonly accepted possible etiologies.<sup>10</sup>

Pathologically, early in the disease the first changes consist of dilatation of proximal esophagus and narrowing of the caudal esophagus, but in more chronic

disease beside dilation there is hypertrophy and tortuosity of the esophagus and its blood vessels.<sup>4,10</sup> Fluoroscopy has a feature of 3 gradual progression : (I). Fusiform dilatation. (II). Flask shaped type. (III). Sigmoid shaped.<sup>4</sup>

Clinically, patients usually complain of difficulty swallowing, regurgitation after meals, weight loss, chest pain and even heart burn.<sup>4,9,10</sup> In this patient we found all the above symptoms.

Diagnosis is usually based on clinical findings, radiological investigation, esophagoscopy, and manometry examination.<sup>4</sup>

Chest X-ray may show air fluid level in an enlarged, fluid filled esophagus. Barium esophagography has a characteristic finding, including esophageal dilation, loss of esophageal peristalsis, poor esophageal emptying, and a smooth, symmetric "bird beak" tapering of the distal esophagus.<sup>3,8,10</sup> This is typically called "rat tail" appearance of achalasia of the cardia.<sup>2</sup> In the patient, we found dilatation of esophagus and narrowing distal esophagus.

Esophagoscopy is always performed to evaluate the distal esophagus and gastroesophageal junction in order to exclude a distal stricture or submucosal infiltrating carcinoma.<sup>8</sup> This is the direct method of establishing the cause of mechanical dysphagia and of identifying mucosal lesion, such as superficial ulcers and esophagitis, which may not be identified by the usual barium meal.<sup>1</sup> In this patient, esophagoscopy showed features of achalasia.

Esophageal manometry is the key test for establishing the diagnosis of achalasia. Because achalasia involves the smooth muscle portion of the esophagus, manometric abnormalities are always confined to the distal two-thirds of the esophagus. The features are as follows: aperistalsis in distal of the esophagus, abnormal lower esophageal sphincter (LES) relaxation, hypertensive LES pressure and low amplitude esophageal contractions.<sup>10</sup> We did not perform a manometry in this patient because the equipment is not available in our hospital.

Achalasia must be distinguished from other motility disorders such as diffuse esophageal spasm, scleroderma, chaga's disease associated with esophageal dysfunction, primary or metastatic tumors can invade the gastroesophageal junction, resulting in a picture resembling that of achalasia called pseudoachalasia.<sup>8</sup>

Although there is no cure for achalasia, the goal of treatment should be relief of the patient's symptoms and improved esophageal emptying. The two most effective

treatment options are graded pneumatic dilation and surgical myotomy. For patients who are high risk for pneumatic dilation or surgery, endoscopic injection of the LES with botulinum toxin or pharmacological treatment with nitrates or a Calcium Channel Blocker (CCB) may be the alternatives for achalasia.<sup>10</sup> Yu and Yang reported that nitrates and CCB generally produced unsatisfactory results in achalasia,<sup>7</sup> as seen in this patient.

Esophageal dilation is the technique used to stretch open the blocked portion of the esophagus. The physician has a variety of techniques available. Each has its own advantage and is appropriate for specific cases. The options are to use simple dilators (bougie), guided wire bougie, balloon dilators and achalasia dilators.<sup>11</sup>

Balloon dilation is a form of definite treatment beside myotomy or Heller's operation.<sup>7</sup> Tarun et al reported that in 76 achalasia patient, 89% of dilations with fluoroscopic

guidance were considered to be successful with no case of esophageal perforation.<sup>6</sup> Michael vaezi et al reported that the most commonly used achalasia balloon dilators in the United States are the non radioopaque graded size polyethylene balloons (microvasive Rigiflex dilators)<sup>10</sup>

Many studies showed good to excellent relief of symptoms in 50-93 % of patients.

Before the procedure, patients are required to fast for at least 12 hours, undergo esophageal lavage with a large-bore tube (if needed), sedation and endoscopy in the right lateral position.<sup>10</sup>

To use the rigiflex achalasia catheter, deflate the balloon as much as possible and pass it trans-orally while monitoring its progress with a fluoroscope or endoscope. Although the catheter will not go through the working channel of the scope, it can pass along the side of the endoscope to insure direct monitoring of its passage. The guide wire is threaded through the working channel of the scope and into cardia. The endoscope is then removed, leaving the guide-wire in place. The catheter is passed over the guidewire and the endoscope is reinstated directly behind the balloon to monitor the catheter's placement. The Rigiflex achalasia catheter may also be used under fluoroscopic guidance. This one has a radiopaque marker proximal to the balloon. The catheter's radiopaque tip is also easily seen under fluoroscopy as are the positioning markers. The guide wire is inserted under fluoroscopic guidance, and the balloon catheter is advanced over the guidewire and into the sphincter. When the balloon is positioned in the esophogogastric junction, it can be inflated using the pneumatic hand pump, which is attached to the balloon lumen on the catheter and is operated like the pump on a blood pressure cuff. When the balloon reaches the desired pressure (12 psi / 0.83 atm/bar), the pump should be closed off and the balloon left inflated for 1-2 minutes.<sup>12</sup>



Figure 2. A Rigiflex® Guide Wire Balloon Dilator

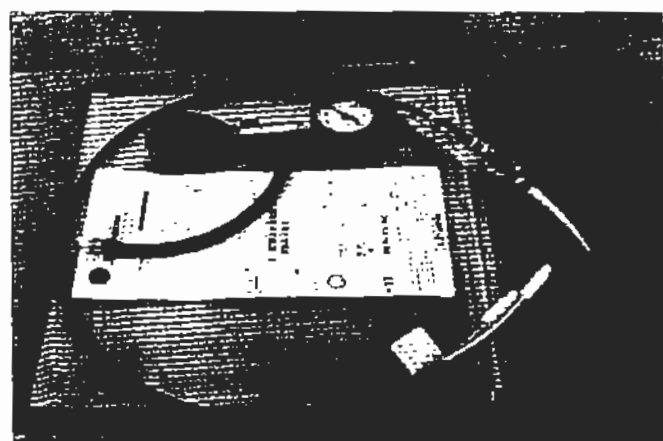


Figure 3. A Rigiflex® Balloon Dilator



Figure 4. Fluoroscopy-guided Dilatation Procedure

The clinical response improves in a graded fashion with increasing size of the balloon diameter. Most experts start with the smallest (3 cm balloon) except in patients who have had prior pneumatic dilations. The main complication of this procedure is perforation, but studies find a 2% cumulative rate using the graded balloon. Other less frequent complications are gastroesophageal reflux (0-9%), aspiration pneumonia, gastrointestinal hemorrhage and esophageal hematoma.<sup>10</sup>

Thus, after pneumatic dilation, all patients should undergo a gastrograffin study followed by barium swallow to exclude esophageal perforation. Before proceeding with pneumatic dilation, it is important to ensure that a cardio-thoracic surgeon is available in case of an esophageal perforation. The need for further dilation is based upon the persistence of symptoms, usually assessed 4 weeks following the procedure or the recurrence of symptoms over time.<sup>10</sup>

In our case, we administered nifedipine (CCB), and then inflated a Rigiflex balloon dilator-guided by fluoroscopy, followed by a chest x-ray to exclude perforation. The results were satisfactory.

## CONCLUSION

Although there is no cure for achalasia, it can be treated in several different ways to relief the patient's symptoms and improve esophageal emptying. One of the most effective treatments is balloon dilation or pneumatic dilation with microvasive dilators. We report a case managed by balloon dilation catheter after failure to respond to conservative treatment.

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