



Current Endoscopic Management of Achalasia Cardia: Review Article

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ABSTRACT

The management of achalasia cardia can be categorized into endoscopic and surgical approaches. Endoscopic management encompasses pneumatic dilatation and botulinum toxin injection. Additionally, peroral endoscopic myotomy is included within endoscopic therapy, although some scholars have classified it under surgical therapy for achalasia. Surgical management involves the implementation of Heller myotomy and esophagectomy. In this review, we will examine the role of botulinum toxin, pneumatic dilatation, and peroral endoscopic myotomy in the management of achalasia cardia, focusing on their indications and associated complications.

INTRODUCTION

Achalasia cardia is an esophageal motility disorder that affects individuals of all racial backgrounds equally and is predominantly observed in those over the age of 50. The incidence rate is approximately 0.5 to 1.5 per 100,000 individuals. This condition is characterized by the degeneration of neurons within the myenteric plexus of the lower esophagus. The etiology remains unknown, and the clinical manifestations include dysphagia to both solids and liquids, accompanied by symptoms such as heartburn and retrosternal chest pain, which may increase susceptibility to recurrent respiratory tract infections (Boeckxstaens, 2007; Richter, 2013; Walzer & Hirano, 2008). The diagnosis of achalasia cardia is established through a series of investigations, including esophagogastroduodenoscopy, barium swallow, and esophageal manometry. Esophagogastroduodenoscopy typically reveals a dilated lower esophagus, while a barium swallow demonstrates narrowing of the lower esophagus, and esophageal manometry indicates the non-relaxation of the lower esophagus during swallowing (Pandolfino & Gawron, 2015; Riccio et al., 2022).

The management of Achalasia Cardia can be categorized into medical and surgical approaches. Medical management includes the administration of botulinum toxin injections into the lower esophagus and endoscopic balloon dilation. Additionally, certain pharmacological agents, such as calcium channel blockers and nitrates, are prescribed for patients who are not suitable candidates for other interventions. Per-oral endoscopic myotomy (POEM) is another endoscopic technique, wherein a myotomy is conducted following an incision in the esophageal mucosa. Surgical management of Achalasia Cardia encompasses Heller's myotomy, predominantly performed laparoscopically, and esophagectomy for individuals with end-stage Achalasia Cardia (Costantini & Costantini, 2026; Dobrowolsky & Fisichella, 2014; Familiari et al., 2015; Richards et al., 2005).

The American College of Gastroenterology (ACG) guidelines for the management of Achalasia cardia recommend pneumatic dilatation as the first-line therapy for patients who are suitable candidates for intervention (Vaezi et al., 2013). In contrast, botulinum toxin is advised for patients who are not suitable for any intervention. Similarly, the European Guidelines on Achalasia advocate for the use of pneumatic dilatation and peroral endoscopic myotomy (POEM) in managing patients with achalasia, while reserving botulinum toxin for those unfit for surgical or endoscopic procedures. Furthermore, these guidelines do not endorse the use of calcium channel blockers and nitrates for the medical treatment of achalasia (Oude Nijhuis et al., 2020).

In this review, we examine the medical management of achalasia cardia, with a particular focus on pneumatic dilatation, peroral endoscopic myotomy (POEM), and botulinum toxin injection. We explore the roles these treatment modalities play in the management of achalasia and its associated complications. A comprehensive literature review was conducted using PUBMED, the

Cochrane Database of Clinical Reviews, and Google Scholar, targeting clinical trials, observational studies, cohort studies, systematic reviews, and meta-analyses from 1980 to 2025. The search employed the following keywords: “Achalasia,” “Botulinum toxin,” “Pneumatic dilatation,” “POEM,” “endoscopy,” and “medical.” All articles were restricted to the English language. Additional articles were identified through manual cross-referencing of the literature. Case reports, studies with fewer than 10 patients, and editorials were excluded. The study included adult male and female patients, while pediatric patients were excluded.

DISCUSSION

Botulinum Toxin injection for achalasia cardia

Botulinum toxin injection is a therapeutic approach for achalasia cardia, administered endoscopically into the lower esophagus to induce paralysis and relaxation of the lower esophageal sphincter. The most frequently utilized form of botulinum toxin is Botox, particularly in patients who are unsuitable for invasive surgical procedures and those over the age of 50 (Hedde & Cock, 2020; Ramzan & Nassri, 2013). The efficacy of botulinum toxin in managing achalasia was evaluated by Pasricha et al. in a double-blind trial, wherein 20 patients received 80 units of botulinum toxin. Of these, 19 patients experienced immediate symptomatic relief, with 14 maintaining clinical relief after six months (Pasricha, 1995). A multi-center prospective trial conducted by Cuilliere et al. examined the outcomes of patients treated with intrasphincteric botulinum toxin injection. This study included 55 patients and reported a 60% success rate six months post-injection (Cuilliere et al., 1997).

Annese et al. conducted a multicenter randomized study on the efficacy of botulinum toxin in the treatment of achalasia cardia, involving a total of 118 patients. The study reported a success rate of 68% after 24 months (Annese, 2000.). Neubrand et al. investigated the long-term outcomes of botulinum toxin injections for managing achalasia, concluding that the treatment was particularly effective for elderly patients. (Neubrand et al., 2002.). Additionally, a multicenter prospective cohort study by Martinek et al. on the use of botulinum toxin for achalasia treatment indicated that up to 70% of patients experienced a relapse within two years post-therapy (Martinek et al., 2003).

A Cochrane review conducted by Leyden et al. compared endoscopic pneumatic dilatation with botulinum toxin injection. The review included seven studies encompassing 178 patients. The findings indicated no significant differences in mean esophageal pressure between the two interventions; however, pneumatic dilatation was associated with superior outcomes after 12 months compared to botulinum toxin injection (Leyden et al., 2014). Additionally, a randomized controlled trial by Mikaeli et al. compared botulinum toxin injection to pneumatic dilatation for the treatment of achalasia. In this trial, 40 patients were randomized, with 20 receiving botulinum toxin injections and 20 undergoing pneumatic dilatation. The study reported no major complications between the groups, but pneumatic dilatation achieved a 100% remission rate at one year, in contrast to a 60% remission rate with botulinum toxin injection. (Mikaeli et al., 2001.).

Pneumatic Dilatation for Achalasia Cardia

Pneumatic dilation is the most prevalent non-surgical intervention for achalasia cardia, involving the fluoroscopic introduction of a balloon. This balloon is inflated at the gastroesophageal junction to facilitate the progressive and controlled disruption of muscle fibers. The RigiFlex balloon is the most commonly utilized dilator, available in sizes of 30, 35, and 40 mm. The primary complication associated with this procedure is esophageal perforation (Allaix & Patti, 2015). Howard et al. examined the outcomes of pneumatic dilation as a first-line treatment for achalasia, treating 67 patients and achieving a success rate of 80% (Howard et al., 2010). Aljebreen et al. assessed the efficacy of pneumatic dilation in achalasia patients, reporting a clinical remission rate of 76.6% at a 53-month follow-up (Aljebreen et al., 2014).

Hulselmans et al. conducted a long-term follow-up study on patients who underwent pneumatic balloon dilatation for the treatment of achalasia cardia. In this study, 209 patients received pneumatic dilatation, with 66% requiring no further treatment and 23% necessitating an additional dilatation. At a 70-month follow-up, the success rate was reported to be 72% (Hulselmans et al., 2010). Eckhardt et al. evaluated the long-term outcomes of pneumatic dilatation for achalasia cardia, following patients for up to 5 years, and found a remission rate of 36% (Eckardt et al., 2004). Katsinelos et al. investigated the long-term results of pneumatic dilatation for achalasia with a follow-up period of 15 years, reporting success rates of 78%, 61%, and 58.3% at 5, 10, and 15 years, respectively (Katsinelos et al., 2005). Muller et al. examined the outcomes of pneumatic dilatation by following patients for up to 25 years, with cumulative success rates of 64%, 53%, 49%, 42%, 36%, and 36% at 2, 5, 10, 15, 20, and 25 years, respectively (Müller et al., 2018). Predictive factors for successful pneumatic dilatation in the treatment of achalasia cardia include age, particularly in patients over 50 years, and a post-dilatation lower esophageal sphincter pressure of less than 10 mmHg. (Ghoshal et al., 2012; Tuset et al., 2009).

Van Hoeij et al. conducted a systematic review and meta-analysis to evaluate the safety and efficacy of pneumatic dilatation in the treatment of achalasia. This study incorporated data from 10 studies, encompassing a total of 643 patients. The success rates associated with dilatation using 30mm, 35mm, and 40mm balloons were 81%, 79%, and 90%, respectively. The incidence of esophageal perforation was 3.2% with the 35mm balloon, compared to 1.0% with the 30mm balloon. A graded approach, initiated with the 30mm balloon and progressing to the 35mm and 40mm balloons, was linked to improved outcomes in managing achalasia cardia (van Hoeij et al., 2019). Additionally, Bonifacio et al. conducted a systematic review and meta-analysis of randomized

controlled trials comparing pneumatic dilatation with laparoscopic Heller's myotomy. This analysis included four studies with a total of 404 patients. The findings indicated no significant differences in remission rates between the two procedures; however, pneumatic dilatation was associated with a higher rate of esophageal perforation.(Bonifácio et al., 2019).

Peroral Endoscopic Myotomy (POEM)

Peroral endoscopic myotomy is a procedure in which a myotomy is conducted endoscopically. The process involves making an incision in the mucosa and creating a submucosal tunnel. A solution of methylene blue and saline is employed to distinguish the submucosa from the circular muscle. Subsequently, the myotomy is executed using an electrosurgical knife, with caution taken to avoid puncturing the mucosa. This procedure typically involves 5 cm to 7 cm of the esophagus and extends up to 3 cm into the stomach. Generally, a full-thickness myotomy is performed, and the mucosa is closed with clips. This procedure can be conducted as either a day-care or an overnight stay. The most common complications include esophageal perforation and pneumoperitoneum, while other complications may involve subcutaneous emphysema or mediastinal emphysema. Late complications can include esophagitis and reflux esophagitis.(Bechara et al., 2015; Bredenoord et al., 2014; Drexel et al., 2020; Miranda-García et al., 2017; Stavropoulos et al., 2014). The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), in their guidelines for the use of peroral endoscopic myotomy, has recommended its application in the primary management of achalasia cardia(Kohn et al., 2021).

Ramchandani et al. investigated the efficacy of per-oral endoscopic myotomy by conducting a follow-up study involving 200 patients who underwent this procedure. The clinical success rate was reported at 92%, while the incidence of erosive esophagitis was 16%(Ramchandani et al., 2016). In a separate study, Inoue et al. performed per-oral endoscopic myotomy on 500 patients, achieving completion in all cases with a morbidity rate of 3.2%. The gastroesophageal reflux rate was observed to be 21.3% at a three-year follow-up(Inoue et al., 2015). Zhong et al. conducted a systematic review and meta-analysis on the quality of life following per-oral endoscopic myotomy for esophageal achalasia. This study included 12 studies with a total of 549 patients and demonstrated a significant improvement in quality of life post-procedure.(Zhong et al., 2020). Vespa et al. also conducted a systematic review and meta-analysis focusing on the long-term outcomes of per-oral endoscopic myotomy for achalasia. Their analysis included 11 studies with 2,342 patients, revealing a long-term clinical efficacy rate of 87%, a reflux esophagitis rate of 22%, and a major adverse effects rate of 1.5%(Vespa et al., 2023). Talukdar et al. performed a systematic review and meta-analysis to evaluate the efficacy of per-oral endoscopic myotomy in treating achalasia. This study incorporated 29 studies with 1,045 patients and found significant improvements in dysphagia symptoms and the Eckardt score. The findings indicated that per-oral endoscopic myotomy is effective in managing achalasia, with outcomes comparable to those of laparoscopic Heller myotomy.(Talukdar et al., 2015).

Dirks et al. conducted a systematic review and meta-analysis to compare peroral endoscopic myotomy with pneumatic dilatation and Heller myotomy in the treatment of achalasia. This study incorporated 28 studies involving 2,291 patients. The findings indicated that the clinical success rates of peroral endoscopic myotomy and Heller myotomy were nearly equivalent; however, the incidence of reflux esophagitis was higher in the peroral endoscopic myotomy group. Nevertheless, peroral endoscopic myotomy demonstrated superior outcomes compared to pneumatic dilatation(Dirks et al., 2021). Similarly, Aiolfi et al. performed a systematic review and Bayesian network meta-analysis to evaluate Laparoscopic Heller myotomy, peroral endoscopic myotomy, and pneumatic dilatation in achalasia management. This analysis included 19 studies with a total of 4,407 patients. The results revealed that postoperative dysphagia symptoms were more favorable in the peroral endoscopic myotomy group, although the rates of reflux esophagitis were higher than those observed with laparoscopic Heller myotomy and pneumatic dilatation.(Aiolfi et al., 2020).

Table I

Study	Study Type	Year	N=numbers	Efficacy of POEM (%)
Inoue et al	Retrospective study	2015	500	90%
Ramchandani et al	Retrospective study	2016	200	92%
Vespa et al	Systematic review & Meta-analysis	2023	2342	87.3%

Table showing the efficacy rate for Peroral endoscopic myotomy (POEM)

CONCLUSION

The endoscopic management of achalasia cardia has increasingly favored peroral endoscopic myotomy as the primary treatment modality for this condition. The minimally invasive nature and superior outcomes associated with peroral endoscopic myotomy have established it as the predominant endoscopic or surgical procedure for managing achalasia cardia. While pneumatic dilatation remains a viable option in the primary management of achalasia cardia, it is important to inform patients about the reduced efficacy following repeated dilatations and the potential risk of esophageal perforation. Conversely, botulinum toxin injection is typically reserved for patients who are not suitable candidates for surgical intervention.

Conflict of interest-There is no conflict of interest

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