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Chapter 16

The Endoscopic Management of Achalasia Cardia: Review

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Abstract

The management of achalasia cardia can be divided into endoscopic and surgical management. Endoscopic management can be divided into pneumatic dilatation and botulinum toxin injection. Peroral endoscopic myotomy is also included in the endoscopic therapy, although some have considered it under surgical therapy for achalasia. Surgical management involves the use of Heller myotomy and esophagectomy. In this review, we will investigate the role of botulinum toxin, pneumatic dilatation, and peroral endoscopic myotomy in the management of achalasia cardia, looking at its indications and complications.

Keywords: Achalasia, Botulinum toxin, Endoscopy, Medical, Pneumatic dilatation, and POEM.

1. Introduction

Achalasia cardia is a motility disorder of the esophagus that affects both races equally and is usually seen in those above 50. It has an incidence of 0.5 to 1.5 per 100,000 population. This condition is characterized by loss of neurons in the myenteric plexus of the lower esophagus. The etiology for this condition is unknown, and the clinical presentation is that of dysphagia to both solids and liquids, and there may also be symptoms of heartburn and retrosternal chest pain, which may predispose them to recurrent respiratory tract infections [1–3]. The diagnosis of achalasia cardia is obtained by the following investigations, which include esophagogastroduodenoscopy, barium swallow, and esophageal manometry. Esophagogastroduodenoscopy will often reveal a dilated lower esophagus, while barium swallow will demonstrate the narrowing of the lower esophagus, and esophageal manometry will show the non-relaxation of the lower esophagus on swallowing [4, 5].

The management of Achalasia Cardia can be divided into medical and surgical management. Medical management involves botulinum toxin injection in the lower esophagus and endoscopic balloon dilatation. Certain drugs, like calcium channel blockers and nitrates, are used for patients who are not fit for any other intervention. Per-oral endoscopic myotomy (POEM) is another endoscopic procedure where a myotomy is performed after making an incision in the mucosa of the esophagus. The surgical management of achalasia cardia includes Heller's myotomy, which is most commonly performed laparoscopically, and esophagectomy for patients with end-stage achalasia cardia [6–9].

The American College of Gastroenterology (ACG) in its guidelines for the management of Achalasia cardia has recommended pneumatic dilatation as first-line therapy for patients who are fit to undergo intervention, and botulinum toxin is recommended for patients who are not fit to undergo any interventioni [10]. The European Guidelines on Achalasia have recommended pneumatic dilatation and POEM for the management of patients who present with achalasia, and botulinum toxin is reserved for patients who are not fit for any surgical or endoscopic intervention. They have also not recommended the use of calcium channel blockers and nitrates for the medical treatment of achalasia [11].

In this review, we will look at the medical management of achalasia cardia, especially looking into Pneumatic dilatation, POEM, and botulinum toxin injection. We will look at the role these treatment modalities play in the management of achalasia and its complications. We conducted a literature review using PUBMED, Cochrane database of clinical reviews, and Google Scholar, looking for clinical trials, observational studies, cohort studies, systematic reviews, and meta-analyses from 1980 to 2025. We used the following keywords: "Achalasia", "Botulinum toxin", "Pneumatic dilatation", "POEM", "endoscopy", and" medical". All articles were in the English language only. Further articles were obtained by manually cross-referencing the literature. Case reports and studies with fewer than 10 patients and editorials were excluded. Adult male and female patients were included in this study, and pediatric patients were excluded.

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2. Discussion

Botulinum Toxin injection for achalasia cardia

Botulinum toxin injection is a form of therapy for achalasia cardia, where it is injected endoscopically into the lower esophagus to paralyze the lower esophageal sphincter and relax it. The most common type of botulinum toxin that is used is Botox, and it is most used in patients who are not fit for an invasive surgical intervention, and in patients who are above 50 years old [12, 13]. The role of botulinum toxin in the management of achalasia was assessed by Pasricha et al in their double-blind trial, where 20 patients received 80 units of botulinum toxin, and 19 out of 20 patients showed immediate symptomatic relief, with 14 having sustained clinical relief after 6 months [14]. A multi-center prospective trial, which looked at the outcomes of patients treated with intrasphincteric injection of botulinum toxin by Cuilliere et al. A total of 55 patients were included in this study, and there was a 60% success rate after 6 months following botulinum toxin injection [15].

A Multicenter randomized study of the treatment of botulinum toxin in achalasia cardia was conducted by Annese et al. A total of 118 patients were included in this study, and the success rate after 24 months was 68% [16]. Neubrand et al looked at the long-term results of botulinum toxin injection in the management of achalasia and found that this treatment was most effective for elderly patients [17]. A multi-center prospective cohort study by Martinek et al on the treatment of achalasia by botulinum toxin showed that up to 70% of patients will endure a relapse in 2 years after therapy [18].

A Cochrane review was conducted by Leyden et al comparing Endoscopic pneumatic dilatation versus botulinum toxin injection. Seven studies with 178 patients were included, and there were no significant differences in the mean esophageal pressure, but pneumatic dilatation was associated with a better outcome after 12 months when compared to botulinum toxin injection [19]. A randomized controlled trial comparing botulinum toxin injection to pneumatic dilatation for the treatment of achalasia was conducted by [20]. A total of 40 patients were randomized to 20 who underwent botulinum toxin injection and 20 pneumatic dilatations. There were no major complications between the groups, but pneumatic dilatation was associated with a 100% remission rate at one year, compared to 60% from botulinum toxin injection [20].

Pneumatic Dilatation for Achalasia Cardia

This is the most common non-surgical procedure for achalasia cardia and involves the use of a balloon that is introduced fluoroscopically. It is inflated at the level of the gastroesophageal junction to achieve progressive and controlled tearing of the muscle fibers. The Rigi flex balloon is the most common dilator and comes in 30, 35, and 40mm sizes. The most common complication from this procedure is esophageal perforation [21]. Howard et al looked at the outcome of pneumatic dilatation as a first-line therapy for achalasia, where 67 patients were treated, and the success rate was 80% [22]. The efficacy of pneumatic dilatation for achalasia patients was assessed by Aljebreen et al, and the clinical remission rate was 76.6% at a follow-up of 53 months [23].

The long-term follow-up of patients who had undergone pneumatic balloon dilatation for the treatment of achalasia cardia was conducted by Hulselmans et al. A total of 209 patients were treated with pneumatic dilatation, and 66% required no additional treatment, and 23% required an additional dilatation. At a follow-up of 70 months, the success rate was 72% [24]. The long-term results of pneumatic dilatation for achalasia cardia were assessed by Eckhardt et al, who followed up patients up to 5 years, and the remission rate was 36% [25]. Katsinelos et al looked at the long-term results of pneumatic dilatation for achalasia with a follow-up of 15 years, and the success rate for 5,10, and 15 years was 78%, 61% and 58.3% [26]. Muller et al looked at the outcomes of pneumatic dilatation by following up patients up to 25 years, and the cumulative success rates at 2,5,10,15,20, and 25 years were 64%, 53%, 49%, 42%, 36% and 36% [27]. Some of the predictive factors for success for pneumatic dilatation in the treatment of achalasia cardia include age, with patients above 50 years of age, a post-dilatation lower esophageal sphincter pressure of less than 10mmHg [28, 29].

A systematic review and Meta-analysis on the safety and efficacy of pneumatic dilatation in achalasia was conducted by Van Hoeij et al. A total of 10 studies with 643 patients were included in this study, and dilatation with the 30, 35, and 40mm balloons was associated with a success rate of 81%, 79% and 90% respectively. The esophageal perforation rate was 3.2% with the 35mm balloon compared to 1.0% with the 30mm balloon. A graded approach starting with the 30mm balloon, followed by the 35 and 40 was associated with better outcomes in the management of achalasia cardia [30]. A systematic review and meta-analysis of randomized controlled trials comparing pneumatic dilatation and laparoscopic Heller's myotomy was conducted by Bonifacio et al. A total of 4 studies with 404 patients were included in this study, and there were no significant differences in the remission rates between the procedures, but pneumatic dilatation was associated with a higher esophageal perforation rate [31].

Peroral Endoscopic Myotomy (POEM)

Peroral endoscopic myotomy is a procedure where a myotomy is performed endoscopically. An incision is made in the mucosa, and a submucosal tunnel is made. A mixture of methylene blue and saline is used to delineate the submucosa from the circular muscle. The myotomy is then performed using an electrosurgical knife, taking care not to puncture the mucosa, and it involves 5cm to 7cm of the esophagus and extends up to 3cm of the stomach. Usually, a full-thickness myotomy is performed, and the mucosa is closed with clips. This procedure can be performed as a day-care or an overnight stay. The most common complications are esophageal perforation and pneumoperitoneum. Other complications include subcutaneous emphysema or mediastinal emphysema. Late complications include esophagitis and reflux esophagitis [32–36]. The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), in their guidelines for the use of per-oral endoscopic myotomy, has recommended its use in the primary management of achalasia cardia [37].

Ramchandani et al looked at the efficacy of per-oral endoscopic myotomy by following up 200 patients who had undergone this procedure. The clinical success rate was 92% and the erosive esophagitis was at 16% [38]. Inoue et al performed per-oral endoscopic myotomy in 500 patients, with completion of the procedure in all the patients with a morbidity rate of 3.2%. The gastroesophageal reflux rate was 21.3% at 3 years of follow-up [39]. A Systematic review and meta-analysis on the quality-of-life following peroral endoscopic myotomy for esophageal achalasia was conducted by Zhong et. A total of 12 studies with 549 patients were included in this study, and there was a significant improvement in the quality-of-life following peroral endoscopic myotomy [40]. Vespa et al conducted a systematic review

and meta-analysis on the long-term outcomes of peroral endoscopic myotomy for achalasia. A total of 11 studies with 2342 patients were included in this study, and the long-term clinical efficiency of peroral endoscopic myotomy was 87% and the rate of reflux esophagitis was 22% and major adverse effects was 1.5% [41]. Talukdar et al conducted a systematic review and meta-analysis to look at the efficacy of per-oral endoscopic myotomy in the treatment of achalasia. A total of 29 studies with 1045 patients were included in this study, and there were significant improvements in the symptoms of dysphagia and the Eckardt score. This study showed that peroral endoscopic myotomy was effective in the management of achalasia and had similar outcomes with laparoscopic Heller myotomy [42].

Dirks et al conducted a systematic review and meta-analysis comparing peroral endoscopic myotomy against pneumatic dilatation and Heller myotomy in the management of achalasia. A total of 28 studies with 2291 patients were included in this study, and the clinical success rates were almost similar between peroral endoscopic myotomy and Heller myotomy, but the reflux esophagitis rate was higher in the peroral endoscopic myotomy group. Peroral endoscopic myotomy was, however, associated with better outcomes when compared to pneumatic dilatation [43]. A systematic review and Bayesian network meta-analysis comparing Laparoscopic Heller myotomy, peroral endoscopic myotomy, and pneumatic dilatation in the management of achalasia was conducted by Aiolfi et al. A total of 19 studies with 4407 patients were included in this study, and the post operative dysphagia symptoms were better in the peroral endoscopic myotomy group, but the reflux esophagitis rates were higher than the laparoscopic Heller myotomy and pneumatic dilatation [44].

Table 1: The efficacy rate for Peroral endoscopic myotomy (POEM)

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%

3. Conclusion

The endoscopic management of achalasia cardia has seen a gradual push towards peroral endoscopic myotomy as the primary management of this condition. The minimally invasive nature and better outcomes have promoted peroral endoscopic myotomy as the most common endoscopic/surgical procedure for the management of achalasia cardia. Pneumatic dilatation does have a role to play in the primary management of achalasia cardia, but the decreased efficacy following repeated dilatation and the risk of esophageal perforation should be explained to the patient. Botulinum toxin injection is, however, reserved for patients who are not fit for any surgical intervention.

Conflict of interest

There is no conflict of interest

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