

Intraoperative High Resolution Manometry for tailored Heller myotomy in esophageal achalasia: could it give better results?

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Abstract

Introduction.

Esophageal achalasia is a rare primary motility disorder characterized by impaired lower esophageal sphincter relaxation and absence of esophageal body peristalsis. Achalasia is classified by the Chicago Classification in type I, type II and type III.

The present study evaluates how the use of intraoperative high resolution esophageal manometry (IHREM), driving the exact extension of myotomy throughout the esophagus, could improve outcome in achalasic patients, especially in type III achalasia.

Materials and Methods:

49 achalasic patients underwent laparoscopic Heller myotomy and Dor fundoplication: 25 patients (Group 1: 16 type II achalsia, 7 type III achalasia and 2 type I achalasia), were treated with use of intraoperative real-time High Resolution Manometry (IHREM); the 24 patients of group 2 (15 type II achalasia, 5 type III achalasia and 4 type I achalasia) were treated without IHREM. In both groups intraoperative endoscopy was performed.

We compared groups 1 and 2 for operative time and postoperative Eckardt score at 1, 3, 6 and 12 months after surgery. At 12 months control HREM was performed to compare LES resting pressure and IRP (integrated relaxing pressure).

Results:

Data shows how in group 1 mean LES resting pressure at right after myotomy was 11.8 mmHg. In group 1 Eckardt score decreased from a median preoperative value of 8 to a median postoperative value of 1 at 12 months control. On the contrary, in group 2 a drop from 8 to 3 was observed, with occasional dysphagia as main residual symptom.

After 12 months LES resting pressure and IRP values at the control manometry were significantly reduced in group 1 compared to group 2: mean resting pressure of group 1 was 16.25 against a value of

22.25 for group 2 ($p < 0.001$); average IRP for group 1 was 9.44 against a value of 14.73 for group 2 ($p < 0.001$).

Conclusion:

According to our results IHREM can give a great contribution in treatment of achalasia both detecting residual LES high pressure zone during myotomy, due to not dissected muscle fibers, and driving esophageal myotomy length.

These are preliminary data: a greater sample is needed to confirm these encouraging results; long term follow up is needed.

Introduction.

Esophageal achalasia is a rare primary motility disorder characterized by impaired lower esophageal sphincter relaxation and absence of esophageal body peristalsis.

A complete diagnostic pathway involves close multidisciplinary approach between general practitioner, radiologist, endoscopist, gastroenterologist and surgeon through a careful clinical history and the results of barium swallow, endoscopy, and esophageal manometry²⁸, although gold standard for diagnosis is still high resolution esophageal manometry (HREM)⁴. Based on motility informations on HREM, esophageal achalasia is classified by Chicago Classification 4.0 into 3 subtypes:

- type I: 100% failed peristalsis, without panesophageal contractions;
- type II: 100% failed peristalsis, with panesophageal pressurization (PEP) in at least 20% of swallows;
- type III: premature contractions (distal latency value < 4.5 seconds) in at least 20% of swallows (failed peristalsis or PEP may be present)⁵.

Surgery is the main therapeutic option and international literature agrees in identifying laparoscopic Heller myotomy with Dor fundoplication as the gold standard in the treatment of esophageal achalasia⁶.

Numerous studies reported in literature shows how intraoperative manometry during Heller myotomy has been used to confirm successful reduction of LES pressures after myotomy, although there was no consensus for a standardized technique and intraoperative manometry was not routinely used in most of the centers examined. Most of the published studies, however, used conventional manometry, comparing LES pressure values before and after myotomy.³¹

With the introduction of HREM the use of conventional manometry has almost completely disappeared from clinical practice. In this study we evaluate how the use of intraoperative real-time high resolution manometry during laparoscopic Heller myotomy, driving the exact extension of myotomy throughout the esophagus, could improve outcome for achalasic patients.

Methods:

We retrospectively analyzed a group of 417 symptomatic patients evaluated for dysphagia and/or non-

cardiac thoracic between 2015 and 2020.

All patients were evaluated by upper endoscopy and HREM. Patients with previous invasive treatment (pneumatic dilatation, botulinum toxin, previous surgery etc.) were excluded from this study. In 91 out of 417 patients (21,8%) esophageal achalasia were diagnosed. 12 out of 91 patients had completed the clinical assessment and were treated elsewhere. We completed the preoperative assessment and treated 79 patients.

They were divided into three groups according to the treatment received as follows:

- laparoscopic Heller myotomy and Dor fundoplication in 49 patients (62.0 %);
- pneumatic endoscopic dilatation in 25 patients (31.6%);
- botulinum toxin injection in 5 patients (6.4%)

Achalasic patients who underwent laparoscopic Heller myotomy and Dor fundoplication were divided as follows: 25 patients (Group 1: 16 type II achalasia, 7 type III achalasia and 2 type I achalasia), were treated with use of intraoperative real-time High Resolution Manometry (IHREM); the 24 patients of group 2 (15 type II achalasia, 5 type III achalasia and 4 type I achalasia) were treated without IHREM. In both groups intraoperative endoscopy was performed.

We compared groups 1 and 2 for operative time and postoperative Eckardt score at 1, 3, 6 and 12 months after surgery. At 12 months control HREM was performed to compare LES resting pressure and IRP (integrated relaxation pressure).

Results:

In both groups operative time was evaluated: in patients treated with laparoscopic Heller myotomy and Dor fundoplication supported by IHREM mean operative time was 122 min (range 75 – 170 min), compared with an average time of 149 min (range 115 – 230 min) in patients treated without IHREM but supported by intraoperative esophagogastrosocopy.

Data shows how in group 1 mean LES resting pressure right after myotomy was 11.81 mmHg.

In group 1 Eckardt score decreased from a median preoperative value of 8 to a median postoperative value of 1 at 12 months control. On the contrary, in group 2 a drop from 8 to 3 was observed.

After 12 months LES resting pressure and IRP values at the control manometry were significantly reduced in group 1 compared to group 2: mean resting pressure of group 1 was 16.25 against a value of 22.25 for group 2; ($p<0,001$) average IRP for group 1 was 9.44 against a value of 14.73 for group 2 ($p<0,001$).

Conclusion:

Intraoperative high resolution manometry allows real time evaluation of pressure variations obtained during surgery: this procedure allows the surgeon to verify the possible persistence of the residual muscle fibers that can become responsible, if not dissected, of dysphagia in postoperative period.

According to collected data, in patients treated with IHREM it is possible to achieve lower median resting

pressure and IRP values to prevent postoperative dysphagia, unlike patients treated without intraoperative manometry that attested to significantly higher values. The execution of high-resolution intraoperative manometry does not increase operative times , and is applicable in all conditions with low incidence of complications related to the procedure. According to our study IHREM can give a great contribution in treatment of achalasia, both detecting residual LES high pressure zone during myotomy, due to not dissected muscle fibers and driving the length of esophageal myotomy.

These are preliminary data: a greater sample is needed to confirm these encouraging results.