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POSTER ABSTRACT

P1 | Provocative Tests during High-Resolution Manometry May be Helpful to Distinguish Patients with Eosinophilic Esophagitis Responding to PPI Therapy

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Background and Aim: Eosinophilic esophagitis (EoE) is an up-and-coming condition histologically characterized by 15 eosinophil x HPF from esophageal biopsies. Proton pump inhibitor (PPI) represents the first line approach of this condition. No demographic or clinical parameters have found able to predict response to treatment. Standard high-resolution manometry (HRM) did not show any specific motor findings in patients with EoE. The aim of this study was to evaluate the role of low (multiple rapid swallow, MRS) and high volume (rapid drinking challenge, RDC) provocative tests in predicting histologic remission after PPI therapy in patients with EoE.
Material and Methods: We evaluated consecutive patients with EoE who underwent HRM and reflux monitoring (impedance-pH) to exclude GERD. HRM was performed according to Italian guidelines. All patients had 3 MRS (5 wet swallows of 2 ml of water in less than 10s) and a RDC (200 ml of water swallowed rapidly). Thereafter, the same treatment with high dose PPI (80 mg esomeprazole for 8 weeks) was administered to every patient, which was followed by a routine endoscopy with 6 esophageal biopsies. According to histology patients were categorized in: responder (<15 Eos x HPF; Group A) and non-responder (>15 Eos x HPF). The results of HRM and MII-pH were evaluated to better understand differences between the two groups.
Results: We evaluated 23 patients (5 female; mean age 32.7 ± 12.9 years; mean BMI 21.5 ± 1.2). Group A was composed by 11 patients (4 female)

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with mean age of 27.6 ± 10.3; Group B was composed by 12 patients (1 female) with mean age of 38.4 ± 13.4 ($P < 0.05$). GERD was excluded in all patients and impedance-pH did not show any significant differences between the two groups. HRM did not show any difference between the two groups in terms of esophagogastric junction parameters and esophageal body motility during the 10 wet swallows. However, MRS and RDC showed a lack of inhibition of esophageal body with frequent panesophageal pressurization ($P < 0.001$).

Conclusions: Provocative tests during standard HRM seem able to distinguish responder from non-responder to PPI treatment. These preliminary results, if confirmed by larger and prospective studies, will be useful to choose steroids or diet as first-line approach for treating EoE patients.

P2 | A Sub-Classification of Esophago-Gastric Junction Morphology Type I May be Useful to Better Recognize Gerd Patients with a Positive Impedance-PH Monitoring

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Aim: High-resolution manometry (HRM) provides information on esophagogastric junction (EGJ) morphology, being able to distinguish whether the lower esophageal sphincter (LES) and crural diaphragm (CD) are superimposed or separated. Actually, three different subtypes can be described by means of HRM, and it was recently demonstrated that increasing separation between LES and CD could cause a gradual and significant increase of reflux. Type I morphology is the group with the lowest incidence of a positive impedance-pH test. However, this latter type also includes in its definition the presence of LES-CD axial separation up to 1 cm. Aim was to verify if a sub-classification of the EGJ Type I could better correlate with a positive impedance-pH test in patients with reflux symptoms.

Methods: Consecutive patients with heartburn and/or regurgitation and a recent endoscopic assessment were enrolled. All patients underwent HRM to assess the EGJ and 10 single water swallows to evaluate the esophageal peristalsis and EGJ function. The tracings were analyzed and each EGJ was classified based on the Chicago Classification (CC) 3.0. EGJ Type I was further divided into Type IA, a complete overlap of LES and CD, and Type IB, a minimal separation, with LES located from the upper border of CD (in correspondence of pressure inversion point, 0.0 cm) to 1 cm above. The patients then underwent impedance-pH testing off-therapy. We measured the esophageal acid exposure time (AET), number of total impedance-detected reflux episodes and symptom association analysis using symptom association probability (SAP+ if ≥ 95%) and symptom index (SI+ if ≥ 50%).

Results : We enrolled 168 [75M/93F; mean age 47 (18-81)] consecutive patients and identified 101 (60.1%) patients with Type I EGJ, 37 (22%) with Type II EGJ and 30 (17.9%) with Type III EGJ. Patients with Type III EGJ had an higher median number of reflux episodes, a greater mean AET and had more frequently a positive symptoms association compared to patients with Type II and Type I EGJ (Table 1). Overall, Type I subjects showed a positive MII-pH in 45.5% of cases, with the lowest value of number of reflux episodes, AET and positive symptom association. Using the sub-classification, we identified 54 (53.6%) Type IA and 47 (46.5%) Type IB subjects. Type IB had a higher number of reflux episodes (42 vs. 28, $P < 0.03$), a greater mean AET (4.7 vs. 2.9, $P < 0.05$) and a greater positive symptom association (54% vs. 26%, $P < 0.02$) compared to Type IA. Type IB morphology had a more frequent probability to show a positive MII-pH than Type IA (70.2% vs. 30%, $P < 0.001$).

Conclusions : With increasing separation between the LES and the CD patients had a gradually and significantly increase of reflux episodes and esophageal acid exposure. The sub-classification of EGJ Type I can be useful to better estimate an abnormal impedance-pH testing in GERD patients and it supports the role of the intra-abdominal LES segment in preventing reflux.

	EGJ Type I (n = 101)	EGJ Type IA (n = 54)	EGJ Type IB (n = 47)	EGJ Type II (n = 37)	EGJ Type III (n = 30)	*P* value
Patients with GERD (%)	45.5	30	70.2	75.6	96.6	0.001*
Total number of reflux (mean ± S.D.)	32 ± 21	28 ± 17	42 ± 28	48 ± 36	73 ± 42	0.001§
AET % (mean ± S.D.)	3.2 ± 3	2.9 ± 0.9	4.7 ± 2.1	11 ± 12	17 ± 13	0.001°
Patients with positive symptom association (%)	38.6	26	54	70.2	86.6	0.001ç

* $P < 0.001$ between EGJ Type III vs II, III vs I, III vs IA, III vs IB, II vs I, II vs IA, IB vs IA

§ $P < 0.001$ between EGJ Type III vs II, III vs I, III vs IA, III vs IB, II vs I, II vs IA, IB vs IA

° $P < 0.001$ between EGJ Type III vs II, III vs I, III vs IA, III vs IB, II vs I, II vs IA, II vs IB, IB vs IA

ç $P < 0.001$ between EGJ Type III vs II, III vs I, III vs IA, III vs IB, II vs I, II vs IA, IB vs IA

P3 | Esophago-Gastric Junction Contractile Integral (EGJ-CI) May Predict Response to Treatment in Patients with Esophageal Achalasia

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Background: Achalasia is defined by the inability of the lower esophageal sphincter to relax in the setting of absent peristalsis. Treatment is focused on reducing symptoms, improve quality of life and prevent complications. Treatments options are pneumatic dilation (PD), per-oral endoscopic miotomy (POEM) or Heller-Dor miotomy (HDM) and are actually suggested according to achalasia pattern at high resolution manometry (HRM). The aim of this study was to evaluate the esophago-gastric junction contractile integral (EGJ-CI) in a series of patients with achalasia who underwent PD or HDM at our center.

Methods: We evaluated consecutive patients with achalasia. During diagnostic approach all patients underwent upper endoscopy, X-ray and esophageal HRM. During HRM we evaluated mean and expiratory EGJ pressure, integrated relaxation pressure (IRP) and EGJ-CI. Treatment options were decided according to achalasia HRM pattern, age, anaestesiologic risk and patient choice. All patients were evaluated with X-Ray and Eckart symptom score 6-month after treatment. According to the treatment efficacy, all patients were divided in: Group A (responder) characterized by no residual dysphagia and normal X-Ray; Group B (non-responder) residual dysphagia and barium retention.

Results: We enrolled 56 patients (27 female) with mean age 60.6 ± 17.8 yrs. All patients had dysphagia and barium retention during X-Ray at baseline. Twenty-eight patients were treated with PD and the same number with HDM. The HRM pattern was: 20 patients with type I, 33 patients type II and 3 type III. According to the patients outcome, we had 35 patients (18 female) considered as responder and 21 patients (9 female) as non-responder. IRP was higher in non-responder compared to responder (28.1 ± 8.8 vs 42 ± 16.1; $P < 0.001$). Similarly, EGJ-CI was significantly different in responder compared to non-responder (79.7 ± 21.4 vs 88 ± 36.9; $P < 0.001$). In contrast, expiratory (51.5 ± 15.4 vs 59.7 ± 15.3; $P = 0.058$) as well as mean EGJ pressure (47.6 ± 14.8 vs 52.2 ± 16.2; $P = 0.281$) were not different between the two groups. A ROC analysis showed that EGJ-CI (cut-off value 82.95 mmHg-cm) had the best performance (AUC 0.854, sensibility 85.7% and specificity 80%) to predict response to treatment in patients with achalasia undergoing endoscopic or surgical treatment.

Conclusions: Our data suggest that EGJ-CI has the greater diagnostic performance in distinguishing responder to non-responder and should be routinely evaluated in order to choose the best treatment approach for these patients.

P4 | The Measurement of Upper Esophageal Sphincter Contractile Integral Reveals a Potential Protective Mechanism Against Pulmonary Aspiration in Patients with Achalasia and GERD

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Background : High-resolution manometry is currently considered the gold standard method for studying esophageal motility. The recent revision of Chicago Classification does not take into account the evaluation of the upper esophageal sphincter (UES). However, recent investigations highlighted the potential role of HRM in assessing this anatomical structure and its role in some esophageal diseases.

Aim : Our aim was to characterize UES profile by means of HRM in patients with achalasia and gastro-esophageal reflux disease (GERD) compared to normal subjects.

Methods : Within consecutive patients undergoing esophageal HRM and impedance-pH monitoring we have enrolled thirty patients. For comparison, 10 (2M, mean age 52) subjects were enrolled as healthy controls (HCs). HRM was performed following current Italian guidelines (Dig Liver Dis. 2016;48:1124-35). HRM tracings were evaluated according to Chicago Classification, whereas impedance-pH parameters were analyzed applying previous published normal values (Dig Liver Dis. 2006;38:226-32). Moreover, the UES has been evaluated in terms of UES resting pressure (mmHg), UES length (cm) and mean UES contractile integral (UES-CI), measured starting from 5 sec before UES relaxation and lasting for another 10 sec. in ten wet swallows.

Results: Using Chicago Classification v.3, 10 (4 Male, mean age 59) patients were diagnosed with type II achalasia and 20 (9M, mean age 55) patients with GERD due to an abnormal esophageal acid exposure time at reflux testing (AET > 4.2%). The length of UES and UES resting pressure were similar among patients and normal subjects (Achalasia 3.36 vs. GERD 3.385 vs. HCs 3.24, $P = 0.8$; Achalasia 162.5 vs. GERD 151.5 vs. HCs 153.8, $P = 0.6$). In contrast, mean UES-CI was found to be significantly higher among patients with achalasia type II compared to normal subjects (Achalasia 3974.9 vs. HCs 2913.6, $P < 0.05$). Similarly, mean UES-CI was found to be significantly greater among patients with GERD compared to normal subjects (GERD 3314.5 vs. HCs 2913.6, $P < 0.05$). No differences were found between patients with GERD compared to those with achalasia type II (GERD 3314.5 vs. Achalasia 3974.9, P =ns).

Conclusions: Mean UES-CI are higher in patients with achalasia and in those with GERD compared to healthy subjects. This finding could be due to a protective mechanism against the risk of aspiration in patients with achalasia and GERD.

P5 | Nutritional Status in Achalasia as Assessed by the Must Score

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Purpose: Achalasia is a primary esophageal motility disorder leading to progressive dysphagia and weight loss. Reduced food intake causes malnutrition in some achalasia patients. The aim of this study was to assess the changes of nutritional status over the pre-operative and post-operative period in patients with documented achalasia treated by Heller myotomy and Dor fundoplication.

Methods: The institutional research database was queried to assess the value of MUST (Malnutrition Universal Screening Tool) as a screening tool to define the nutritional status in patients with achalasia before and after Heller myotomy and Dor fundoplication. The MUST score was compared to clinical history and the Body Mass Index (BMI) before and after surgery. Wilcoxon signed rank test was used to compare pre- and post-operative values.

Results: Between January 2015 and March 2016, pre- and post-operative MUST assessment was done in 46 unselected patients. Pre-operative BMI was within physiological range (18.5-24.9 Kg/m^2) in 63% of the patients; underweight and serious leanness were recorded in 4.4% and 2.2% of patients, respectively. 17.4% of patients had a BMI between 25-29,9 (Kg/ m^2), and 10.9% had a BMI between 30-34.9 (Kg/m^2) (Table 1). In contrast, the prevalence of malnutrition risk was high (MUST ≥ 2) in 56,5% of the patients (Table 2). During a follow-up of 12 months post-surgery, the BMI trend of patients increased: BMI was within physiological range in 50% of the patients, 28.2% of the patients were overweight and 15.2% were obese. The MUST scores decreased compared to baseline; a malnutrition risk was still present in 6.5% of patients (Table 2).

Table 1

BMI (kg/ m^2)	Pre-operative	Post-operative	*P*
<18.4, n (%)	4 (8.8)	3 (6.6)	
18.5 – 24.9, n (%)	29 (63.0)	23 (50.0)	
25.0-29.9, n (%)	8 (17.4)	13 (28.2)	
>30.0 , n (%)	5 (10.9)	7 (15.2)	

Table 2

Must score	Pre-operative	Post-operative	*P*
< 2, n (%)	20 (43.5)	43 (93.4)	
≥ 2, n (%)	26 (56.5)	3 (5.6)	

Conclusions: Preoperative BMI is misleading in patients with achalasia. Despite an apparently adequate nutritional status based on BMI, MUST scores are abnormal in more than half of patients. Heller myotomy significantly improved the nutritional status compared to pre-operative values. In the future, use of body composition assessment tools (Bio-electrical Impedance Analysis, BIA) and a dietary survey based on daily records may provide a complete picture of nutritional status in these patients.

P6 | Achalasia is a Common Finding in Patients with EoE Undergoing High-Resolution Manometry

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Background and Aims: Eosinophilic Esophagitis (EoE) is a chronic immune/antigen-mediated disorder, characterized by symptoms of esophageal dysfunction (dysphagia and/or food impaction) and, histologically, by eosinophilic-infiltration. EoE has been associated with various esophageal motility disorders, ranging from hypo- to hypercontractile motility abnormalities, and more recently achalasia. The aim of this study was to assess the incidence of achalasia in patients with EoE, and to evaluate the disease course of EoE after achalasia treatment.

Materials and Methods: 97 consecutive patients (mean age 39, range 18-75 yo, 20 F), with a diagnosis of EoE assessed in our Unit between 2012 to 2018, were included. The diagnosis was posed according to international criteria (presence of typical symptoms of esophageal dysfunction; at least 15 eosinophils per high-power field at mid/proximal oesophagus), excluding other causes of eosinophilia. Among 97 patients, in 47 (48%) conventional manometry (CM) or high resolution manometry (HRM) were not performed and were excluded from the study. Patients who accepted to undergo HRM, were studied by suing the standardised international protocol and manometric diagnoses were carried out according to Chicago Classification 3.0.

Patient no	1	2	3	4	5
Sex	F	M	F	M	M
History of Allergy	No	Allergic dermatitis and rhinitis	No	Allergic rhinitis	Allergic conjunctivitis
Age at EoE Diagnosis (years)	68	16	73	22	21
EoE Onset (years)	50	6	58	16	16
Diagnostic delay	18	10	22	6	5
Main symptoms	Dysphagia	Dysphagia	Regurgitation	Globus and Dysphagia	Dysphagia and Odynophagia
Endoscopy (EREFS score)	E1R1E1F0S1 = 4	E1R2E1F1S0 = 5	E1R0E1F0S1 = 3	E0R1E1F0S1 = 3	E1R1E1F0S0 = 3
HR M	Achalasia type II	Achalasia type III	Achalasia type I	Achalasia type III	Achalasia type II
Esophago- gram	Dilation of the esophagus, narrow EGJ	Delayed esophageal emptying	Esophageal stasis, narrow EGJ	Narrow EGJ	Dilation of the esophagus, narrow EGJ
PPI Response	Yes	Yes	No	No	No
Topic Steroid	/	No	No (stop for intolerance)	Yes	Yes
Achalasia therapy	Endoscopic dilation	Not Required	Surgery (Heller+Dor)	Not Required	Endoscopic dilation and then Surgery (Heller+Dor)
EoE outcome after achalasia treatment	PPI responder	PPI responder	Refractory EoE	Steroid respoder	Steroid responder

Results: Among the 50 EoE patients (mean age 41, range 20-75 yo, 8 F), 25 (50%) included, 25 (50%) showed normal manometric pattern, whereas 16 (64%) had hypocontractile disorders, 9 (36%) hypercontractile abnormalities, and 5 (20%) had a diagnosis of achalasia. The table shows the characteristics of the 5 EoE patients with achalasia and the response to the therapies.

Conclusion: This retrospective study of consecutive patients showed that achalasia, is not uncommon in patients with EoE, affecting about 10% of patients of this cohort. No specific subtype of achalasia is associated with EoE. The high frequency of this association seems to hypothesize a causal link between these two pathologies, whereas all this variability in manometric pattern, epidemiological characteristic and response to therapy, suggests that the relationship is not univocal and that there may be different mechanisms that act independently to determine such association.

P7 | Oesophagus Gastric Junction Outflow Obstruction: Diagnosis and Treatment

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Background and Aim: Esophagogastric junction outflow obstruction (EGJOO) is a novel Esophageal High Resolution Manometry (EHRM) diagnosis caractherized by impaired lower esophageal sphincter (LES) relaxation with preserved or weak peristalsis. EGJOO could be idiopatic or the result of a mechanic obstruction. The main clinical presentation is characterized by dysphagia and retrosternal pain, sometimes also regurgitation and pirosis. The aim of this study is to clarify the diagnosis criteria and comparing the outcomes of the treatments available for this new entity.

Method: 598 patients were screened at our institution for dysphagia, retrosternal pain and pirosis from late 2016 to late 2018. All patients underwent EGDS or barium esophagogram, to exclude mechanic cause of dysphagia, and then to EHRM. 74 patients met Chicago criteria for EGJOO, and only 2 patients had a obstruction secondary to a mechanic cause (Nissen fundoplication). Although no curative definitive treatment protocols are currently available for EGJOO, the patients can benefit from medical treatment and endoscopic pneumatic dilatation, or from Heller myotomy and (PerOral Endocopic Myotomy) POEM in extremely rare cases, when there's no response to previous treatment. In our study 2 patients developed type II-achalasia from a previous EGJOO on follow-up. They were treated with laparoscopic Heller myotomy + Dor fundoplication. 45 patients were categorized as Idiopatic Outflow Obstruction and were treated at our institution as follows:
36 patients have been treated with medical treatment. In detail:

- 29 patients with dysphagia and reflux symptoms, and also with a Impedance/pH metry positive were treated with IPP associated with mucosal protector;
- 4 patients with dysphagia but without reflux symptoms were treated with calcium antagonists drugs;
- 4 patients, not responding to medical treatment, have received endoscopic pneumatic dilatation;

- 2 patients were treated with POEM (in other institutions);
- 5 patients did not follow prescribed therapy;
- 1 patient met criteria for Eosinophilic esophagitis;

The Eckardt score was calculated for every patient, before and after the treatment.

Results: From our data it is clear how the results of the different treatments have been fairly variable: 26 patients had a favorable outcome, 19 had unfavorable outcome. Favorable results were appreciated in 20 patients treated with medical treatments (PPI, trimebutin and calcium channel blockers). Furthermore, positive outcome was appreciated in 2 patients treated with endoscopic pneumatic dilatation, 1 underwent POEM and patient with diagnosis of eosinophilic esophagitis responded with a favorable outcome too. Of all two patients who developed a type II achalasia, both responded well to laparoscopic Heller myotomy and Dor fundoplication. In addiction to these findings, 2 of the 5 patients who did not follow any therapy had a favorable outcome.

Conclusion: In our experience the need for a multidisciplinary approach (endoscopic,manometric and riadiological) to distinguish between idiopathic and secondary causes and mechanical causes is confirmed. Today a lot is known about the diagnostic process for EGJOO, but treatment is a particularly complex topic, especially considering the possible spontaneous regression of the pathology and the variable response to the different pharmacological treatments available to date.

Follow-up is very important, as the evolution in achalasia is possible even if rare.

These are preliminary data: there is a need for a greater study sample and a manometric follow-up, with particular importance for the variation of IRP and DCI after treatment.

P8 | Novel System for Identification of Lower Esophageal Sphincter with Impedance Variation Step-Up Method: A Feasibility Study

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Background: Esophageal manometry is the gold standard for lower esophageal sphincter (LES) localization and for accurate positioning of catheter based pH and multichannel intraluminal impedance pH monitoring (MII-pH). pH variation step-up method is not as accurate as esophageal manometry for LES localization, and needs patients to be OFF therapy. Gastric impedance has very low values compared to esophageal impedance and is not influenced by acid suppression. Our aim was to evaluate feasibility of impedance variation with the step-up method for LES localization.

Methods: 75 patients (31 male, mean age 48 years, range 38-57) who underwent 24-hr MII-pH monitoring were prospectively enrolled. A catheter with six impedance channel and 1 pH channel was used. Patients with known Barrett's oesophagus were excluded. High resolution manometry (HRM) was performed before MII-pH monitoring in order to locate the upper and lower border of the LES and to evaluate esophagogastric junction (EGJ) type. A second operator, blinded to HRM finding, performed the MII-pH study: the catheter was introduced into the stomach (presence of stable impedance values < 500 ohm in the second distal impedance channel located at the level of the pH sensor) and withdrawn gradually (1 cm every 15 seconds; each cm was marked with the “symptom” button) until a sharp impedance rise was seen (increase of > 50% with respect to gastric baseline); in 62 patients step-up was repeated twice. Abnormal pH-MII study was defined as acid exposure time (AET) > 5% and/or positive SI/SAP. A third operator blinded to both HRM and impedance results, reviewed the step-up impedance of all patients. Bland-Altman analysis with Lin concordance and correlation coefficient were used to compare MII-pH and HRM. Subgroups analysis were performed for the following parameters: ON and OFF PPI test and presence and absence of EGJ type ≥ 2. Interobserver agreement and concordance between the two step up impedance performances were evaluated using Spearman rho correlation coefficient.

Results: Descriptive data are shown in table 1. 12/75 patients were on PPI. Median impedance rising point was on average 0.8 cm caudal (95% limits of agreement, LOA: -2.6 cm to 4.2 cm) to manometric upper border of LES and 1.8 cm cranial (95% LOA: -5.1 cm to 1.5 cm) to manometric lower border of LES (Lin concordance correlation coefficients 0.81 and 0.72 respectively). Agreement between the two step-up impedance performances was excellent (mean 44.9 and 45 cm, rho 0.97). Interobserver agreement was excellent (mean 44.9 and 44.8 cm, rho 0.94). Impedance variation performances were similar between patients OFF and ON PPI and between presence/absence of EGJ type ≥ 2.

Conclusions: In this ongoing study we observed a good correlation between impedance rise and manometric localization of the upper border of the LES. ON-PPI examination and presence of EGJ type ≥ 2 do not alter performance reliability. Intra and interobserver agreement were excellent. Impedance variation with the step-up method is a promising method for LES identification and an alternative to HRM, where it is not available, also for patients ON-PPI.

Table 1 Manometric and MII-pH descriptive data in 75 patients. Data expressed as mean; interquartile range.

Manometric upper border of LES, cm	44.1; 42-46
Manometric lower border of LES, cm	46.8; 44-48
Impedance rise LES, cm	44.9; 43-47
Gastric impedance, ohm	327; 230-400
Impedance at variation point, ohm	2149; 1350-2885
MNBI, ohm	1547; 870-2100
Pathological MII-pH, patients	29*

*11/29 reflux hypersensitivity (i.e. normal AET and abnormal SI/SAP)

P9 | Esophageal Motility Disorders in Eosinophilic Esophagitis

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Background and Aims: Eosinophilic Esophagitis (EoE) is a chronic immune/antigen- mediated disorder, characterize by symptoms of esophageal dysfunction and esophageal eosinophilic-infiltration. EoE has been often associated with esophageal motility abnormalities, ranging from hypo- to hyper- contractile motility disorders. The aim of this study was to evaluate the incidence and clinical characteristics of esophageal motility disorders in EoE.

Material and Methods: 97 consecutive patients (mean age 39, range 18-75yo, 20 F) with a diagnosis of EoE, assessed in our unit between 2012 to 2018, were included. The diagnosis was posed according to international criteria (presence of typical symptom of esophageal dysfunction, at least 15 eosinophils per high-power field at mid/proximal esophagus), excluding other causes of eosinophilia. Medical history, epidemiological and demographic data of these patients were collected. Among 97 patients, in 47 (48%) high resolution manometry (HRM) was not performed and were excluded from the study. Patients who accepted to undergo HRM, were studied by using the standardised international protocol and manometric diagnoses were carried out according to Chicago Classification 3.0. For the statistical analysis Fisher exact test was used.

Results: Among 50 patients included (mean age 41, range 20-75 yo, 42M), 26 (52%) showed normal manometric pattern. Between the EoE patients who showed a pathological pattern, 16 (67%) had hypocontractile disorders, and 8 (33%) had hypercontractile abnormalities. In particular, EoE patients with hypocontractile patterns had frequent failed peristalses (N = 4), ineffective esophageal motility (N = 6), fragmented peristalsis (N = 4), absent peristalsis (N = 2). Among EoE patients with hypercontractile patterns, we found achalasia type III (N = 2), achalasia type II (N = 2), achalasia type I (N = 1), EGJ outflow obstruction (N = 1), Jackhammer esophagus (N = 1), and 1 distal esophageal spasm (N = 1). The table below shows the characteristics of age, sex and response to proton pump inhibitor (PPI) of patients in relation to their manometric pattern. There was no difference in terms of prevalence of motility abnormalities (P = 0.49) nor a predominance of hypo / hyper contractile pattern (P = 0.14), between PPI responsive and PPI non-responsive patients. Similarly, no difference in terms of motility abnormalities (P = 1), nor a predominance of hypo / hyper contractile (P = 0.60) were found between females and males. Considering the mean age of the group (39yo), there was a different prevalence of motility abnormalities between younger and older patients, with greater frequency of pathological pattern in young patients (P = 0.045). However, there was no difference in terms of frequency of hypo- or hypercontractile disorders between young and old EoE patients (P = 0.49)

Patients with normal motility	26 (52%)
Age (mean and median)	43,4yo; 40,5yo
Age at diagnosis (mean and median)	36,1yo; 33yo
Sex	22M (84,6%)
PPI response	(9 of 17) 52,9%
Patients with motility disorders	24 (48%)
Age (mean and median)	37,9yo; 33,7yo
Age at diagnosis (mean and median)	29,2yo; 25yo
Sex	20M (83,3%)
PPI response	(7 of 18) 38,9%
Patients with hypercontractile disorders	8 (33%)
Age (mean and median)	41,9yo;36,2yo
Age at diagnosis (mean and median)	27,2yo; 29,5yo
Sex	6M (75%)
PPI response	(2 of 9) 22%
Patients with hypocontractile disorders	16 (67%)
Age (mean and median)	36yo; 32yo
Age at diagnosis (mean and median)	30,4yo; 24yo
Sex	14M (87.5%)
PPI response	(5 of 9) 55%

Conclusion: This series shows that esophageal motility abnormalities are present in about half of EoE patients, especially in young subjects who showed a higher prevalence of hypocontractile disorders. A correlation with patient's gender or response to PPI therapy was not observed.

P10 | E-Cadherin and Epidermal Growth Factor (EGF) as Non-Invasive Biomarkers Predictive of Gastro-Esophageal Reflux Disease

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Aim: Gastro-esophageal reflux disease is an emerging condition in the developed countries often needing expensive and invasive investigations in order to be diagnosed. Furthermore, these investigations cannot directly evaluate the microscopic damage of the esophageal mucosa, typical of the first stages of disease. Some studies show breakage of the tight junctions in the esophageal

mucosa caused by acid exposure, leading to dilated intercellular spaces and subsequently increased permeability of the epithelium. In addition, other studies show a significant change in the salivary volume and composition in patients affected by GERD compared with healthy people. However, there are only few studies that use these biomarkers to create a non-invasive laboratory test to early diagnose GERD and predict its evolution. The aim of our study is to evaluate the utility of fasting e-cadherin and EGF levels in serum and saliva as a non-invasive test to predict the presence of gastro-esophageal reflux disease in patients with typical, atypical or extra-esophageal symptoms compared with healthy volunteers and to find any correlation among e-cadherin or EGF levels and patients' characteristics, symptoms or endoscopic findings.

Methods: In our observational, single institution and two-arm study we enrolled 30 off-therapy and non-smoker patients undergoing upper GI endoscopy and 10 heathy volunteers. All the subjects filled GERD-HRQL and RSI questionnaires at the time of enrollment. We collected, centrifuged and froze (-80°C) the salivary and serum samples before analyzing them using an ELISA test. Eventually, we analyzed data obtained with MedCalc® e SPSS®.

Results: Our study shows that e-cadherin concentration is statistically higher in patients' serum ($P = 0.03$) and even more in salivary samples ($P < 0.001$). In addition, we demonstrate that patients' serum e-cadherin concentration is related to the BMI ($P = 0.03$) and to the presence of hiatal hernia ($P = 0.02$). The salivary EGF level is statistically higher in patients than in controls ($P = 0.03$), while the serum concentration is similar. Therefore, e-cadherin and salivary EGF can be used as selective biomarkers for acid-induced esophageal epithelial damage.

Conclusions: Our study proved that salivary e-cadherin and EGF are specific biomarkers of GERD. Serum concentrations of these two analytes can be used to support the accuracy of a future non-invasive diagnostic test.

P11 | Rapid Drink Challenge is Not Accurate in Predicting Complete Empting at Timed Barium Esophagogram in Achalasia Treated Patients

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Background: Achalasia is a major esophageal motor disorder. Esophageal empting at timed barium esophagogram (TBE) is the diagnostic test of choice in order to check for adequate empting after endoscopic or surgical treatment, which is a reliable predictor of long term remission. Rapid drink challenge during high resolution manometry (HRM) evaluates latent obstruction at the level of the esophagogastric junction (EGJ) which could obviate the use of TBE. However, the predictive role of RDC for evaluation of adequate esophageal empting in treated achalasia patients has not been extensively explored.

Aim and Methods: To evaluate obstructive parameters of RDC in achalasia treated patients with complete and incomplete empting at TBE. Achalasia treated patients who underwent TBE and RDC during HRM in the same week during their follow-up were included in the study. HRM was performed with a solid state catheter. After 10 single swallows, RDC in the sitting position was performed with 200 ml of water. Obstructive variables during RDC were acquired (i.e. IRP, number and percentage of pressurization at 20 mmHg, EGJ pressure gradient). TBE was performed after HRM or within a week with 200 ml of barium sulfate suspension; esophagogram were acquired at 1, 3 and 5 minute after ingestion to determine height of barium column in the esophagus. Complete empting at TBE was defined as residual barium column of ≤ 1 cm at 5 minute. Comparisons were made with Mann-Whitney analysis.

Results: 28 achalasia patients were included in the study (16 female, 56 yrs; 48-70). All patients but 2 were treated with one or more pneumatic dilation (PD) and the other 2 with surgical miotomy. Follow-up time after RDC-TBE performance was 12 months (9-16). At the time of follow-up 23 patients were in remission (Eckardt score ≤ 3) whereas 5 patients were not and underwent another PD or surgery. 17 patients had complete empting at TBE (16 of them in clinical remission). Comparing patients with complete and incomplete empting at TBE none of the RDC parameters evaluated was different between the two groups (see table 1).

Conclusions: In this pilot study, values of obstructive variables at RDC overlapped between patients with complete and incomplete empting at TBE. RDC does not seem to predict complete esophageal empting.

Table 1. Clinical and manometric parameters in achalasia patients with complete and incomplete empting at TBE. Data shown as Median; 5th-95th centile

	Complete empting (17)	Incomplete empting (11)
Pneumatic dilation, number*	1; 1-2	2; 1-2
Eckardt score	1; 0-4	2; 1-4
Basal tone of LES, mmHg	9; 1-24	13; 5-25
RDC variables		
Pressurization, number	0; 0-3	1; 0-5
Pressurization at 20 mmHg, percentage	0; 0-17	3; 0-62
IRP RDC, mmHg	14; 1- 25	17; 4-25
Esophagogastric gradient, mmHg	8; -3 to 18	13; -1 to 19

*in 26 patients

IRP, integrated relaxation pressure; SS, single swallows; RDC, rapid drink challenge

P12 | Proton Pump Inhibitor Therapy Improves Both Nasal Symptoms and Cytology in Patients with Non-Allergic Rhinitis with Neutrophils

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Objectives: A recent study has shown a possible association between gastroesophageal reflux disease (GERD) and non-allergic rhinitis with neutrophils (NARNE). We investigated whether proton pump inhibitor therapy improved both nasal symptoms due to rhinitis and neutrophils count in nasal cytology.

Methods: 20 patients with nasal symptoms, > 20% neutrophils in nasal cytology (without spores and bacteria) (NARNE) and pathologic pH-impedance monitoring were given 40 mg of pantoprazole twice daily for 12 weeks. After the treatment period, symptom assessment with a validated questionnaire, nasal cytology and pH-impedance monitoring were repeated in order to study the effect of acid suppression.

Results: After 12 weeks, patients referred a significant lower rhinorrhea and post-nasal drainage (respectively 5.5 vs. 2.8, P = 0.0244, and 5.9 vs. 3, P = 0.220, according to VAS scale). As expected, while acid exposure time was suppressed (7.2 vs. 0.2, P = 0.0001), the total number of refluxes was similar, while acid reflux episodes (38.5 vs. 2, P = 0,0001) became predominantly non-acid (15.5 vs. 28, P = 0.0045). 14 out of 20 patients repeated nasal cytology, which was negative for NARNE (< 20% neutrophils) in 10 patients (84%, P = 0.0103). At multivariate analysis the reduction of total acid refluxes was the only independent predictor of the improvement of nasal cytology (P = 0.0296).

Conclusions: Among patients with NARNE and pathologic pH-impedance monitoring, twice daily therapy with PPI significantly improved nasal symptoms and cytology. According to these findings, acidic refluxate could be involved in the development of NARNE.

P13 | Upper Esophageal Sphincter (UES) Analysis in Patients with Achalasia According to High Resolution Manometry

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Introduction: Achalasia is a rare esophageal motility disorder classified in 3 manometric subtypes. While the role of LES in achalasia has been widely studied, UES features are not extensively recognized in this setting and little is known about the relationship between UES motility pattern and the 3 manometric achalasia subtypes. The aim of this study is to evaluate UES motility function in patients with achalasia according with the 3 manometric subtypes.

Methods: 44 patients with achalasia were evaluated with upper endoscopy, esophagogram and HRM and classified in 3 subtypes according to Chicago classification. Moreover UES motility function according to high-resolution manometry parameters has been studied.

Results: 6 patients (13,6%) showed type I achalasia, 30 (68,2%) type II and 8 (18,2%) type III achalasia. Manometric UES motility function analysis revealed UES dysfunction in 27 patients (61,4%): 3 (11,1%) in type I, 22 (81,5%) in type II and 2 (7,4%) in type III. UES function parameters (median residual pressure, relaxation time and duration, recovery time) were significantly different among achalasia subtypes (respectively 11.95 mmHg, 130 ms, 738 ms, 586 ms in type I, 18.2 mmHg,193.5 ms, 851 ms, 576.5 ms in type II and 8.55 mmHg, 87.5 ms, 711.5 ms, 638.5 ms in type III). Statistical analysis revealed a significant correlation between UES relaxation time and type II achalasia (P:0,044); moreover UES disfunction was more frequent in younger patients (P:0,020) and in males (P:0,047).

Conclusion: UES dysfunction was demonstrated in the majority of patients with achalasia, in particular in patients with type II. Young male patients had higher risk to show UES impairment.

P14 | *Escherichia Coli* Nissle 1917 Restores Intestinal Epithelial Barrier: A Molecular Study

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Background and Aims: The pathogenesis of several gastrointestinal diseases, such as inflammatory bowel diseases and Irritable Bowel Syndrome (IBS) may depend on different alterations at the expense of intestinal epithelial barrier. Since pharmacological interventions to restore epithelial barrier are limited, an interesting perspective is represented by probiotics, which are live microorganisms commonly used in clinical practice. Escherichia coli Nissle 1917 (EcN) is a probiotic effective in the maintenance of remission of ulcerative colitis, although the underlying molecular mechanisms remain unclear. The aim of this study was to investigate the potential effect of EcN in restoring the increase of intestinal permeability caused by known inflammatory stimuli, by the mediators spontaneously released by IBS biopsies, and to evaluate the molecular mechanisms involved.

Methods: CaCo-2 cells were used as an in vitro model of intestinal epithelial barrier. Two concentrations of EcN (10^8 and 10^6) were applied to CaCo-2 with or without SLIGRL (a protease-activated receptor-2 activating peptide), tumor necrosis factor (TNF)-a, interferon (IFN)-g and inflammatory mediators spontaneously released (SUP) by mucosal biopsies of patients with IBS and healthy controls (HC). Paracellular permeability was evaluated using sulfonic-acid-conjugated to fluorescein

(FITC). qPCR was used to assess mRNA expression of tight junction proteins, zonula occludens-1 (ZO-1), claudin-1 and occludin.

Results: EcN induced a dose-dependent reinforcement of CaCo-2 monolayer of 52% (10^8, $P < 0.05$) and 32% (10^6) compared to untreated CaCo-2 (CTR). SLIGRL 50uM and 200uM induced a significant increase in CaCo-2 permeability compared to CTR ($P < 0.05$); the co-incubation of SLIGRL and EcN induced a recovery of epithelial integrity compared to SLIGRL alone. TNF-a and IFN-g induced an increase in CaCo-2 permeability compared to CTR reverted by EcN. SUP of patients with IBS induced a significant increase of paracellular permeability compared to HC SUP ($P < 0.05$). The co-incubation of EcN with IBS-D or -C SUP induced a recovery of permeability rate compared to SUP alone ($P < 0.05$). No effect of EcN was observed with IBS-M SUP. qPCR analysis showed EcN induced a significant increase in ZO-1 and occludin expression compared to CTR. Permeability rate significantly correlated with severity and frequency of abdominal pain and distension.

Conclusion: EcN reverts the increase of epithelial monolayer permeability induced by inflammatory stimuli and IBS SUP. EcN restores the integrity of intestinal epithelial barrier enhancing the expression of tight junction proteins. These results pave the way to future studies to understand the potential application of EcN in IBS.

P15 | Neuroimmune Effect of Secondary Bile Acids on an In Vitro Model of Neuroimmune Interaction

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Background and Aims : Irritable bowel syndrome (IBS) is a functional bowel disorder affecting 8-12% of the world population. IBS is characterized by recurrent abdominal pain and change of feces consistency associated with diarrhea (IBS-D), constipation (IBS-C) or with mixed bowel habits (IBS-M, Drossman and Hasler, 2016). Multiple factors contribute to IBS pathophysiology, such as stress, increased mucosal permeability, alteration of the intestinal microbiota, bile acid malabsorption, and changes of neuro-immune interaction. In particular, Duboc and colleagues described an altered fecal content of primary and secondary bile acids in patients with IBS-D (Duboc et al., 2014). Moreover, our research group described an increased nerve fiber density and a higher number of mucosal mast cells expressing neuronal growth factor (NGF) in colonic biopsies of patients with IBS compared to asymptomatic subjects. Furthermore, neuronal cultures treated with conditioned medium derived from biopsies of IBS patients showed increased neurite outgrowth (Dothel et al., 2015). Upon this basis, the aim of this project was to analyze in vitro the effect of secondary bile acids (deoxycholic acid - DCA and lithocolic acid – LCA) on neurite growth induced by mast cells.

Methods: A triple-chamber device for morphometric analysis (Axis 500TM, Merk-Millipore) was applied to a neuronal cell line (SH-SY5Y) alone or in combination with a mast cell line (HMC1.1) cultured in a second chamber (test chamber) where increasing concentrations of DCA or LCA (0-5-25-50 μM) were tested for 24 h. The same conditions were applied in culture plates to quantify the marker of cytoskeletal remodeling MAP1B through Western Blot. The length of neurites protruding from the SH-SY5Y chamber to the test chamber was analyzed through an inverted microscope (Eclipse Ti STM - Nikon) and the ImageJ software.

Results: HMC1.1 induced an increase of neurite elongation (~2 folds vs CTRL, $P < .001$). This effect was abolished by disodium cromoglycate (100 mM) or NGF antibody (20 μg/ml), indicating the dependency of neurite elongation by NGF stored in mast-cell vesicles. DCA and LCA inhibited neurite outgrowth, particularly at 5 μM in SH-SY5Y w/ or w/o HMC1.1. The abatement of mast-cell-induced neuronal sprouting was confirmed by MAP1B quantification, which assessed a 35% increase of MAP1B in SH-SY5Y induced by HMC1.1 and ~50% decrease at DCA or LCA 5 μM in SH-SY5Y w/ or w/o HMC1.1 ($P < .05$). In addition, an analogous effect was detected upon 25 μM LCA treatment.

Conclusions: This explorative project allowed a thorough analysis of the extent of mast cell-induced neurite outgrowth and, for the first time, the effect of secondary bile acids on neuronal morphology, providing new perspectives for eventual studies on sensory perception in IBS-D.

P16 | The Effect of Zespri Green Kiwifruit on Digestive Functions in Constipated Patients: A Randomized, Controlled, Single-Blind, Cross-Over Study

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Background and Aims: Digestive discomfort, including constipation, is a common condition throughout the world. Gastrointestinal discomfort and bowel habit are two target areas for potential health claims for foods identified by EFSA. Green kiwifruit is often used as natural food for the relief of constipation. Thus, we performed a randomised, controlled, single-blind, cross over clinical trial to assess the effect of green kiwifruit on digestive and gut health functions.

Methods: As a part of an international study which involved three sites around the world using the same protocol (New Zealand, Italy, and Japan), we enrolled three cohorts of participants: 20 healthy controls, 20 patients with functional constipation (FC) and 20 patients with irritable bowel syndrome with constipation (IBS-C), according to Rome III criteria. The study duration was a total of 16 weeks; 2-week lead in, 4-week first intervention, 4 week washout, 4-week second intervention, and final 2-week follow-up. The cross-over design was completed using kiwifruit intervention (2

green kiwifruit per day [Actinidia deliciosa var. Hayward]), compared to a positive control intervention of psyllium (7.5 g of psyllium per day). The primary outcome measure was quantification of complete spontaneous bowel movement (CSBM). Secondary outcome measures included additional stool frequency measures (spontaneous bowel movements [SBM], complete bowel movements [CBM], bowel movements [BM]), the Gastrointestinal Symptom Rating Scale (GSRS), the IBS-QoL questionnaire, together with objective measures of gastrointestinal transit times using Smart Pills. Faecal sample collection was required for immune measures and DNA extraction to microbial analysis.

Results: The primary outcome measure (quantification of CBSM) was found to be significantly improved by kiwifruit as compared with psyllium. In particular, analysing the data for all the constipated patients, we showed that the test product, kiwifruit, is effective and adequately rules out an unacceptable loss of the control effect. Interestingly, better results were obtained in patients with FC as compared with IBS-C. Similar results were obtained for all the analysed secondary outcome measures, suggesting the non-inferiority of kiwifruit in comparison with psyllium.

Conclusion: In this study we demonstrated the efficacy and safety of kiwifruit as a food intervention for the relief of constipation and associated symptoms in patients with FC and IBS-C, using validated outcome measures. As empiric therapy should begin with a fibre supplement in constipated patients, including psyllium, also kiwifruit should be considered in these patients. ClinicalTrials.gov Identifier: NCT02888392.

P17 | Histomorphological and Molecular Study on Constipated Parkinson's Disease Patients: Results of a Pilot Study

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Objective: According to Braak's hypothesis the bowel could be used by a pathogen to access the target neuronal populations in Parkinson's disease (PD) and PD patients can report gastrointestinal disturbances before the onset of neurological impairment.

Aims: To evaluate in constipated PD patients: 1) levels of inflammatory markers in blood and stool; 2) changes of factors essential for the integrity of the intestinal mucosal barrier.

Methods: Ten constipated PD patients and 10 constipated, sex- and age-matched, patients were enrolled. Constipation was diagnosed according to Rome IV criteria. Gastroenterological (Bristol Stool Chart, PAC-SYM, PAC-QoL, ODS) and neurological (UPDSRS, PDQ-39, MMT, HAMD-17, SCOPA-AUT, NMSS) questionnaires were administered to all subjects. They also underwent blood (CBC, TSH, CRP, TNF, IL-1β, LBP) and stool (Hp antigen, fecal calprotectin, IL-1β, TNF) tests. In all subjects a colonoscopy was carried out and biopsies from sigma and descending colon were taken and subsequently processed for morphological evaluations. We used haematoxylin/eosin staining to evaluate eosinophilic density as an inflammatory index, sirius red/fast green staining to assess collagen deposition as marker of remodeling due to chronic inflammation in the lamina propria, toluidine blue staining to measure acid mucin as an indicator of changes in mucus producing cells and confocal immunofluorescence was employed to detect the amount of claudin-1 (component of tight junctions) in the intestinal epithelial barrier.

Results: In 7/10 PD patients the onset of constipation preceded the PD diagnosis. Faecal IL-1β levels were higher in PD patients as compared to controls (18.2 ± 9.7 pg/g vs 9.3 ± 3.7 pg/g; $P < 0.05$). Faecal TNF and serum LBP levels were higher in PD patients (66.2 ± 47.5 vs 56.3 ± 34.6 pg/g and 33.6 ± 14.8 vs 23.9 ± 5.6 ng/ml, respectively). Eosinophilic density was higher in controls than in PD patients (56 ± 16 vs 13 ± 4 / mm^2; $P < 0.05$). Collagen levels and acid mucin were higher in PD patients (18.6 ± 2.5 vs 13.1 ± 1.3 positive pixel percentage; $P < 0.05$, and 14.7 ± 1.6 vs 10.3 ± 1.5 positive pixel percentage; $P < 0.05$). Claudin-1 expression decreased along the epithelial surfaces in PD patients, faecal calprotectin, CBC, TSH, CRP were normal and Hp faecal antigen was negative in both groups.

Conclusions: The increased levels of IL-1β faecal, TNF faecal and LBP serum in PD patients suggest the presence of a mild, clinically undetectable, intestinal inflammation. The presence of a remodeling process, shown by the higher levels of collagen, further supports this hypothesis. The decreased claudin-1 expression and increased mucin acid levels indicate an alteration of the intestinal barrier that could be due to inflammation. Further studies could show if the intestinal alterations are part of the first step of the pathophysiologic process or simply a consequence of the disease.

P18 | Comparison between High Resolution and 3D Anorectal Manometry and Dynamic - Magnetic Resonance Imaging for the Diagnosis of Obstructive Defecation Diagnosis

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Introduction: High Resolution-3D Anorectal Manometry (HR-3D ARM) evaluates anal sphincters activity determining the regional pressure distribuition along length and circumference of anal canal during resting, contraction and straining. Dynamic Magnetic

Resonance Imaging (DMRI) evaluates evacuation obtaining morphological data about the same phases. The aim of the study is understanding if HR-3D ARM and DMRI are the same to diagnose pelvic floor dyssynergia (for which the gold standard test is HR-3D ARM, according to *RAO et al* classification) and rectal prolapse (for which the gold standard test is D-MRI to point out the rectum actively prolapsing), or if they could becomplementary.

Methods: 41 patients (27 women, 14 man) with obstructed defecation syndrome were submitted to HR-3D ARM (manufactured by Given Imaging) and D-MRI, at the University Hospitalof Palermo. We analized HR-3D ARM traces and D-MRI images to evaluate the presence of pelvic floor dyssynergia, especially pubo-rectalis one (RAO I and II), and rectal prolapse.

Results: Discrepancies between HR-3D ARM and D-MRI data about pelvic floor dyssynergia were shown in 19,5% ofpatients (26 vs 7%, woman vs man), instead discrepancies about rectal prolapse were shown in 36,6% of patients (33 vs 42%, woman vs man). Using HR-3D ARM as golden test for pubo-rectalis dyssynergia, D-MRI has a sensibility of 76% (64 vs 90%, woman vs man) and a specificity of 85% (87 vs 75%, woman vs man). Using DMRI as golden test for rectal prolapse, HR-3D ARM has a sensibility of 75% (74 vs 80%, woman vs man) and a specificity of 30% (12,5 vs 40, woman vs man).

	Sensitivity	Specificity	L+	L-
Defecatory Dyssynergia in MR-D (*Gold Standard HR/3DHD ARM*)	**90** (68.3-98.77)	**52.38** (29.78-74.29)	**1.89** (1.18-3.03)	**0.19** (0.05-0.76)
Rectal prolapse in HD/3D HR ARM (*Gold Standard MR-D*)	**61.29** (42.19-78.15)	**50.00** (23.04-76.96)	**1.23** (0.68-2.22)	**0.77** (0.39-1.54)
Rectal prolapse in 3D HD–ARM(*Gold Standard MR-D*)	**39.13** (19.71-61.46)	**47.06** (22.98-72.19)	**0.74** (0.37-1.46)	**1.29** (0.71-2.36)

Conclusions: From those preliminary data HR-3D ARM e D-MRI seem to be complementary diagnostic exams to better evaluate pubo-rectalis dyssynergia, but not to evaluate rectal prolapse, because of overestimation of rectal prolapse by HR-3D ARM.

This is an interesting preliminary study to develop a flow chart in the obstructive defecation diagnosis. Statistically significant results could be obtained from a larger sample.

P19 | Gastroparesis is a Clinical Expression of Enteric Dysmotility

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Background: Gastroparesis is defined as a chronic gastric disorder characterized by delayed gastric emptying (GE) and symptoms suggestive of gastroduodenal motor disorders (Parkman et al. Gastroenterology 2004;127;1589-91). It recognizes three different grades of increasing severity: 1) mild gastroparesis with easily controlled symptoms and body weight maintained on a regular diet; 2) compensated gastroparesis with moderate symptoms partially controlled by daily medications and nutrition maintained by dietary adjustments; 3) gastric failure with refractory, uncontrolled symptoms, inability to maintain an oral nutrition, frequent physician / emergency department visits, hospitalizations. GE abnormalities are only partially related to the type and severity of symptoms and other pathophysiological mechanisms may be involved.

Aim: To investigated the presence of enteric dysmotility in patients with suspected gastroparesis.

Methods: Patients with symptoms suggestive of gastroparesis were consecutively included in the study and underwent both a 378 kcal 13C-octanoic acid GE breath test and a small bowel stationary manometry. Relevant issues of health status were also recorded for each patient according to pre-defined, validated questionnaires at entry.

Results: Eighty-eight patients (71 F; 37.8 $\pm$ 14.3 yrs, mean$\pm$SD) were enrolled. GE was delayed in 25 patients (28.4%), and 70 patients (79.5%) presented small bowel motor abnormalities suggestive of clear-cut enteric dysmotility. GE was delayed in 24 of 70 patients with enteric dysmotility, (34.3% vs 5.5 % patients with normal small bowel manometry). Enteric dysmotility was detected in 24 of 25 patients (96%) with delayed GE. Moderate/severe manifestation of gastroparesis were significantly more frequent in patients with enteric dysmotility (grade 1: 14%, grade 2: 62 %, grade 3: 24%) than in patients with normal small bowel manometry (grade 1: 39%, grade 2: 56 %, grade 3: 5%) ($P < 0.05$) No correlation was found between delayed GE and gastroparesis symptoms.

Conclusions: Enteric dysmotility is more frequent than delayed GE in patients with symptoms of gastroparesis; gastroparesis symptom severity is associated with small bowel motor abnormalities, but not with a delayed gastric emptying.

P20 | Efficacy, Acceptability and Subjective Perception of Foods Triggering IBS Symptoms in Patients on a Low Fodmap Diet

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Objective: Patients with irritable bowel syndrome (IBS) are increasingly treated with a diet low in FOMDAPs (LFD) to manage symptoms such as abdominal pain, bloating and bowel dysfunction). However, there is limited evidence of efficacy and acceptability of this diet in the long-term. One of the main problems is when and how to start a less strict LFD (adapted LFD: ALFD), based on the FODMAP foods really able to provoke patients' symptoms ("trigger" foods"). Indeed, another crucial matter is whether or not that reported by patients during the clinical history regarding trigger foods is reliable.

Aim: To evaluate: 1) the efficacy and acceptability of a LFD in the medium-long term; 2) the patients' reliability in detecting the real trigger FODMAPs.

Methods: Eighty-eight IBS (Rome IV) patients (45.0 ± 12.6 yrs) were enrolled in our dietetic interventional prospective study. The patients, recruited consecutively, underwent (T0) a LFD for 8 weeks (T1), and then followed an 8-12 week reintroduction period (T2). After this a personalized ALFD was suggested to each patient. To assess medium-long term effects, patients were evaluated again at least 6 months after T2 (T3). We used the IBS Severity Scoring System (IBS-SSS) to assess symptom severity, Likert scales to evaluate the degree of symptom relief (1: completely relieved - 7: as bad as I can imagine) and degree of satisfaction with the diet (0: totally unsatisfied - 10: completely satisfied) and the FODMAP Adherence Report Scale to evaluate dietary adherence. Dietary acceptability and food-related quality of life were evaluated using a 20-item questionnaire adapted from the nutrition-related quality of life questionnaire. Patients' opinions about FODMAP trigger foods at T0 were compared with data obtained at the end of the reintroduction period. Results

At T3 (12.7 ± 4.2 months) IBS-SSS improved compared to T0 (218.9 ± 105.8 vs 324.1 ± 90.2; $P < 0.002$). Patients' satisfaction with ALFD was 7.5 ± 2.4 and degree of relief was 1.8 ± 1.3. Regarding dietary acceptability, patients reported that they needed more time for cooking ($P < 0.0001$), that the diet was more costly ($P < 0.00001$) and that they had problems eating out ($P < 0.0001$) during the LFD, but not during the ALFD. Adherence to the LFD was constantly high (T1: 24.2 ± 0.9; T2: 24.2 ± 0.8; T3:24.0 ± 1.5 ns). As regards patients' perception of trigger foods, a moderate concordance was found only for lactose (k: 0.54), a fair one for fructans, fructose and galactans (k: 0.38, 0.27 and 0.28, respectively) and a poor one for polyols (k: 0.12).

Conclusions: IBS patients are satisfied with a LFD because it improves symptoms. The ALFD is effective also in the medium-long term; as it is less restrictive than the LFD, patients have fewer difficulties maintaining it, so it is well accepted. The patients' perception regarding "trigger" foods reported during the clinical history is not reliable, so a nutritionist-led ALFD is mandatory, based on actual and not presumed intolerances, in order to tailor the diet more specifically to the individual patients' needs.

P21 | Oral Iron Supplementation with Iron Bisglycinate Chelate in Inflammatory Bowel Disease: A Retrospective Observational Study

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Aim of the Study : Inflammatory bowel disease (IBD) is a relapsing chronic disease of the gastrointestinal (GI) tract. Among IBD patients, anemia is more frequent than in general population, due to multifactorial reasons leading to a worse outcome. FERALGINE® is a co-processed compound between ferrous bysglicinate chelate and alginic acid (which have usually been used as protection for patients affected by gastro esophageal reflux disease).Recent studies demonstrated a good iron absorption using Ferlagine ® oral supplementation with both good compliance rate and efficacy in treating iron deficiency anemia especially due to its high oral bioavailability. Primary outcome of the study was to evaluate hemoglobin (Hb) improvement after Tecnofer Plus® (Feralgine) supplementation in patients with IBD and anemia. As secondary outcome, ferritin level was evaluted as well as patient's reported adherence to therapy.

Material and Methods : This was a retrospective observational study. All data were derived from our patients' registry. All IBD patients suffering from anemia and treated with Tecnofer Plus® (daily dose 1 capsule) were selected.

Results : As the primary outcome is concerned, mean Hb value before martial supplementation was 11 g/dL (IC 10,72-11,47 g/dL), while after three months of iron bisglycinate chelate supplementation Hb mean value was 12,2 g/dL (IC 11,6- 12,52 g/dL), $P = 0,0001$. Regarding tolerability of Tecnofer plus®, 90% of patients reported good tolerance to therapy with no abdominal pain or diarrhea worsening, while 10% of patients experienced dyspepsia and worsening of diarrhea. Only 6% of patients had to suspend oral iron supplementation due to gastrointestinal intolerance while 94% of patients continued therapy as prescribed (patients reported adherence rate 94%).

Conclusion : Although iron deficiency is just one of the multiple factors causing low Hb levels in IBD patients, oral supplementation with Ferlagine ® showed a significant improvement in Hb levels suggesting that in patients without other comorbidities and with no severe anemia oral iron supplementation could be considered as a first line therapy also in IBD patients. In addition to that Tecnofer plus® could be a great option in IBD patients with anemia due to its high tolerability and

adherence rate. We suggest further studies on larger numbers of patients to assess iron, ferritin and transferrin saturation improvement.

P22 | A High Rate of Barrett's Esophagus Five Years after Sleeve Gastrectomy: Results of an International Multicenter Study

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Objective: Recent evidence has indicated an increased risk of Barrett's esophagus (BE) in the long-term after sleeve gastrectomy (SG). Aim: to investigate the spectrum of GERD as well as the prevalence of BE, at minimum 5 years after SG in obese patients who underwent SG in different bariatric centers of two countries, France and Italy.

Methods: Five high volume outpatient centers dedicated to the surgical therapy of obesity and related disorders in France and Italy that routinely perform upper gastrointestinal endoscopy (UGIE) before any bariatric procedures were invited to participate in the study. From January 2017 to June 2018 each center, during the scheduled postoperative evaluation, performed a UGIE in at least 10 consecutive patients, that had performed SG 5 years or more before, without evidence of BE preoperatively. The diagnosis of BE was made if the distal esophagus was lined with columnar epithelium with a minimum length of 1 cm containing specialized intestinal metaplasia at histopathological examination.

Results: 90 (66 F, mean age 41 ± 11 years) consecutive patients were enrolled. The mean follow-up was 78 ± 15 months, and the mean total body weight loss was 25 ± 12%. The prevalence of GERD symptoms, erosive esophagitis, and the usage of PPIs increased from 22%, 10%, and 22% before the SG to 76%, 41% and 52% at the time of follow-up, respectively ($P < 0.05$). The prevalence of BE was 18.8%. The length of BE was always less than 3 cm, then all were classified short BE. In this series, no case of dysplasia was found. The prevalence of BE was not significantly different among the five bariatric centers despite of the higher prevalence of GERD at baseline one center (Padua). Weight loss failure was significantly associated with Barrett's esophagus ($P < 0.01$).

Conclusions: This multicenter study show a high rate of Barrett's esophagus at least 5 year after SG. Weight loss failure was significantly associated with BE. We suggest to provide systematic endoscopy in these patients to rule out this condition.

P23 | Twenty-Five Years of Laparoscopic Treatment for Esophageal Achalasia: Our Experience on 1001 Laparoscopic Heller-Dor Operations

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Background: In the last decade of the past century, primary Laparoscopic Heller-Dor (LHD) for Achalasia progressively became the procedure of choice in the new millennium. The aim of this study was to assess the long-term outcome of LHD to treat Achalasia at a single high-volume institution during the past 25 years.

Methods: 1000 patients underwent LHD from 1992-2017 by 6 staff surgeons alternatively. Patients who had already been treated with surgical or endoscopic myotomy were ruled out. Symptoms were collected and scored using a detailed questionnaire; barium swallow, endoscopy, manometry (conventional or High Resolution technique) were performed, before and after surgery while, 24-hour pH monitoring were performed 6 months after surgery. Treatment failure was defined as a postoperative symptom score > 10^{th} percentile of the preoperative score (i.e. > 8).

Results: LHD was the primary treatment for 1000 patients (M:F = 536:464); the median age was 46 (IQR 36-54), 183 (18.3%) had a history of endoscopic treatments (pneumatic dilation or botox injections, or both). The surgical procedure was completed laparoscopically in all but 7 patients (0.7%) and there was one perioperative death for heart attack. There were 25 perforations (2.5%) which was found unrelated to patients' symptom's score and, age, radiological-stage, manometric-pattern, 22 were recognized and repaired during the operation, 3 were detected by postoperative contrast swallow. In 674 patients were possible assessed the manometric pattern and were classified as having: 310 (46%) pattern I, 315 (46.7%) pattern II and 49 (7.3%) pattern III. The outcome was positive in 902 patients (90.2%). In patients who had a previous treatment the failures were 25/183 (13.7%) while in the primary treatment group the failures were 73/817 (8.9%) ($P = 0.055$). All the 98 patients whose LHD failed subsequently underwent one or more endoscopic pneumatic dilations, which ameliorated their recurrent symptoms in all but 11 patients (10 of whom required reoperation). The overall success rate of the combination of LHD and endoscopic dilations (where necessary) was 98.4%. At univariate analysis, manometric pattern ($P = 0.001$), sigmoid megaesophagus ($P = 0.003$) and a chest pain score ($P = 0.002$)

were the only factors predictive of a positive final results. At multivariate analysis, these three factors were independently associated to good outcome. Postoperative 24-hour pH-monitoring was abnormal in 50/590 patients (8.5%). Two patients developed an esophageal cancer during the follow-up time.

Conclusions: In a university tertiary referral center LHD can durably relieve achalasia symptoms. Preoperative manometric pattern, a presence of a sigmoid esophagus and the chest pain score represent the strongest predictor of outcome.

P24 | The Potential Role of High Resolution Manometry in Preoperative Diagnosis of Hiatal Hernia in Candidates to Sleeve Gastrectomy: A Prospective Evaluation

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Objective: Hiatal hernia (HH) is common in obese patients undergoing bariatric surgery. Preoperative traditional techniques such as upper gastrointestinal endoscopy (UGIE) or barium swallow/esophagram do not always correlate with intraoperative findings. High resolution manometry (HRM) has shown a higher sensitivity and specificity than traditional techniques in non-obese patients in the HH diagnosis, whereas there is a lack of data in the morbidly obese population. We aimed to prospectively assess the diagnostic accuracy of HRM in HH detection, in comparison with barium swallow and UGIE, assuming intraoperative diagnosis as a standard of reference.

Methods: Forty one consecutive morbidly obese patients prospectively recruited from a tertiary-care referral hospital devoted to bariatric and metabolic surgery underwent a preoperative evaluation including standardized GERD questionnaires, barium swallow, UGIE and HRM. The surgical procedures were performed by a single surgeon who was blinded to the results of other investigations.

Results: HH was intraoperatively diagnosed in 11/41 patients (26.8%). In 10/11 patients, the preoperative HRM showed an esophagogastric junction suggestive of HH. When compared to intraoperative evaluation, the sensitivity of the HRM was 90.9% and the specificity 63.3%, with a positive predictive value of 47.6% and a negative predictive value of 95.0%. HRM showed a higher sensitivity and specificity compared to barium swallow and UGIE.

Conclusions: HRM has a high accuracy of HH detection in morbidly obese patients assuming an intraoperative diagnosis as reference standard. It could therefore be a very useful tool in the preoperative work-up of obese patients undergoing bariatric surgery.

P25 | Extending Myotomy both Downwards and Upwards Improves the Final Outcome in Manometric Pattern III Achalasia Patients

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Background: Achalasia is at present classified in 3 manometric patterns. Pattern III is the most unfrequent pattern and is correlated with the worst outcome after all available treatments. We aimed to investigate the final outcome after classic laparoscopic myotomy (length ≤ 8 cm, CLM) as compared with a longer laparoscopic myotomy both downwards and upwards with (length > 8 cm, LLM) in patients with pattern III achalasia.

Methods: The study population consisted of 61 consecutive patients with pattern III achalasia who underwent laparoscopic myotomy between 1997-2017. Patients who had already been treated with surgical or endoscopic procedures were ruled out. Symptoms were collected and scored using a detailed questionnaire; barium-swallow, endoscopy, manometry (conventional or HRM) were performed, before and after surgical treatment. In CLM the total length of the myotomy was ≤ 9 cm, while myotomies extended both downwards and upwards to a length > 9 cm were defined as LLM.

Results: Of the 61 patients representing the study population, 24 had CLM and 37 had LLM. In addition, all the patients add an anterior, partial fundoplication (Dor). The patients' demographic and clinical parameters (sex, symptom-score, duration of symptoms, esophageal-diameter) were similar in both groups. One mucosal perforation was detected and repaired intraoperatively in the LLM group. The median length of the myotomy was 8 cm (IQR:8-9) in the CLM and 10 cm (IQR:10-12) in the LLM ($P < 0.001$). The median of follow-up was 94 months (IQR:52-126) in the CLM and 24 months (IQR:16-40) in the LLM. As a whole, the two groups had a different drop in their symptom score: 22 (17-26) versus 4 (0-8), and 20 (18-27) versus 3 (0-6) for the CLM and LLM respectively ($P < 0.01$). Moreover, failures were 8/24 (33.3%) in the CLM and 4/37 (10.8%) in the LLM ($P < 0.05$). An abnormal acid exposure was detected after the treatment in 4 patients of CLM and in 3 of LLM (P =n.s.). (Table)

Conclusions: In spite of intrinsic limitations of the study (retrospective, different time window of the two procedures and different follow-up), the extension of the length of the myotomy both downwards and upwards improves the final outcome of the laparoscopic

Heller-Dor procedure in patients with pattern III achalasia. On the other hand, a longer myotomy does not influence the development of postoperative gastroesophageal reflux.

Table. Intra- and postoperative data.

	CLM	LLM	*P*-value
Mucosal perforation	0	1	n.s.
Length of myotomy	8 (8-9)	10 (10-12)	<0.01
Follow-up (months)	94 (52-126)	24 (16-40)	<0.001
Postoperative symptom score	4 (0-8)	3 (0-6)	n.s.
Postoperative chest pain score	0 (0-5)	0 (0-0)	n.s.
Failures	8/24 (33.3%)	4/37 (10.8%)	0.047
Postoperative pathological acid reflux by pH study	4	3	n.s.

CLM: classic laparoscopic myotomy; LLM: longer laparoscopic myotomy.

P26 | Traction of the Septum During Transoral Septotomy in Patient with Zenker Diverticulum Improves the Final Outcome

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Background: Transoral Diverticulostomy/Septotomy has become a popular treatment for patients with Zenker Diverticulum (ZD) because of the low complication rates, reduced procedure time, and shorter hospital stay. However, the outcome of this procedure is not, so far, as positive as the open techniques. In order to improve the results of transoral septotomy (TS), a modification of the technique by tractioning the septum with stiches, has been introduced. In this study we aimed to compare the final outcome of a Modify Transoral Septotomy (MTS) with those of the Traditional Transoral Septotomy (TTS) in patients with ZD.

Methods: Fifty-two consecutive patients with ZD underwent Transoral Septotomy between 2010-2018. Patients who had already been treated with surgical or endoscopic procedures were excluded. TTS was performed with the classic technique. Since 2015, we adopted a MTS, by positioning 2 sutures at the lateral edges of the septum, for traction. Symptoms were collected and scored using a detailed questionnaire; barium-swallow (to assess the size of the pouch), endoscopy and manometry were performed before and after surgical treatment. Failures were defined when a patient needed an additional procedure for recurrent symptoms.

Results: Of the 52 patients representing the study population (M:F = 35:17), 25 had TTS and 27 had MTS. The patients' demographic and clinical parameters (sex, age, symptom-score, duration of symptoms, diverticulum size) were similar in both groups. No intraoperative mucosal lesions were detected and mortality was nil. The median time of the procedure was 25 min (IQR:22-35) in the TTS and 30 min (IQR:25-36) in the MTS ($P < 0.07$). The median follow-up was 69 months (IQR:46-95) in the TTS and 30 months (IQR:25-35) in the MTS. All the patients in both groups had a reduction in the symptom score after the procedure but the failure rate was 32% (8/25) in the TTS and 3.7% (1/27) in the MTS ($P < 0.02$).

At the univariate and multivariate analyses, the surgical procedure was the only factor predictive of a positive final result.

Conclusions: In spite of intrinsic limitations of the study (retrospective, different time window and different follow-up), traction of the septum during Transoral Septotomy improves the final outcome of this treatment in patients with ZD.

P27 | High-Resolution Manometric Findings after Magnetic Sphincter Augmentation

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Aim: The aim of this study was to evaluate the esophageal motility pattern before and after magnetic sphincter augmentation (MSA) for medically refractory Gastro-Esophageal Reflux Disease (GERD).

Methods: We reviewed the prospectively collected database of patients who underwent MSA (Linx procedure) between 2007 and 2018. All patients who completed pre- and post-operative high-resolution manometry (HRM) were included in the study. Additional investigations included Health-Related Quality of Life (HRQL) questionnaire, upper gastrointestinal endoscopy, barium swallow and 24-48 hours pH-study. Demographic, clinical and manometric data were analyzed. Wilcoxon signed rank test and McNemar test were used as appropriate.

Results: Eleven patients met the inclusion criteria. There was a significant reduction in the rate of heartburn (54.5% vs. 0.0%, $P = 0.031$), regurgitation (63.6% vs. 0.0%, $P = 0.016$), and respiratory symptoms (54.5% vs. 0.0%, $P = 0.031$). Also, the HRQL-score significantly decreased (13.3 ± 7.8 vs. 3.6 ± 2.8, $P = 0.06$) compared to baseline. The proportion of patients using proton-pump inhibitors decreased from 63.6% to 9.1% ($P = 0.031$). The manometric parameters are reported in Table 1. There was a significant increase of mean Distal Contractile Integral (DCI), intrabolus pressure and Distal Esophageal Amplitude (DEA). The mean postoperative Lower Esophageal Sphincter (LES) basal pressure was similar compared to baseline. Two patients (18.2%) had an Integrated Relaxation Pressure (IRP) > 15 mmHg. One of them complained of mild dysphagia not requiring treatment, and the other patient

was asymptomatic. Interestingly, two patients had Ineffective Esophageal Motility (IEM) in the preoperative study, that resolved postoperatively.

Table 1.

Variable	Pre-operative	Post-operative	*P*
DCI (mmHg*s*cm) ± SD	940.3 ± 471.4	2259.2 ± 942.8	0.001
Intrabolus Pressure (mmHg) ± SD	8.5 ± 3.7	20.6 ± 6.4	0.002
DEA (mmHg), ± SD	65.7 ± 23.4	102.6 ± 36.5	0.002
LES Basal Pressure (mmHg) ± SD	31.5 ± 16.3	29.6 ± 16.5	0.535
LES Residual Pressure (mmHg) ± SD	6.3 ± 7.2	10.8 ± 7.8	0.078

Conclusions: In this subset of patients, MSA was clinically effective in relieving both typical and atypical GERD symptoms. The HRM findings indicate that esophago-gastric junction outflow obstruction is uncommon and not associated with symptoms. An increased DCI may compensate for the increased LES relaxation pressure. Finally, ineffective esophageal motility may reverse to normal after MSA.

P28 | Surgical Treatment of Achalasia in Patients with Severe Neurological Disorders

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Aim: Achalasia is a rare condition and its association with neurological disorders is even less frequent. The presentation of achalasia in the context of severe neurological disorders is poorly addressed in the literature and represents a challenge for the clinician. Aim of our study was to report our experience with the surgical management of achalasia in this extremely complex subset of patients.

Methods: We retrospectively reviewed our dedicated database of patients with a definitive diagnosis of achalasia who underwent laparoscopic Heller Dor (LHD) between 1992 and 2017. Only patients meeting the specific criteria for the diagnosis of severe neurological disorder were included. Symptoms of achalasia were collected and scored using a detailed questionnaire: dysphagia, chest pain and food regurgitation were calculated by combining the severity of each symptom (0 = none, 2 = mild, 4 = moderate, 6 = severe) with its frequency (0 = never, 1 = occasionally, 2 = once a month, 3 = every week, 4 = twice a week, 5 = daily). Barium swallow, endoscopy, and manometry were performed before and after surgery; and 24-h pH monitoring was done 6 months after LHD to rule out post operative GERD. None of the patients had a previous endoscopic treatment. All the patients underwent LHD with the technique in use at our Institution. Treatment failure was defined as a post-operative symptom score higher than the 10th percentile of the pre-operative score of all patients operated at our Center.

Results: Patients' characteristics and postoperative outcome are summarized in table 1. We were able to safely perform a LHD in all patients, without intra or postoperative surgical complications. Minor complications related to the underlying neurological diseases occurred in two patients and were resolved by medical treatment. Median hospital stay was comparable to that of the general population of operated patients. After a median follow up of 14 months, a significant resolution of the preoperative symptoms was obtained in all patients, with only one patient requiring complementary dilations. Postoperative GERD was present in 1/5 patients.

Conclusions: The onset of dysphagia in the setting of severe neurological disorders should always be evaluated by endoscopy and esophageal function tests for the possible, albeit rare, association with achalasia. The surgical treatment of this subset of patient by LHD is safe, feasible and with good outcomes in terms of symptoms resolution.

Table 1.

	Pt #1	Pt #2	Pt #3	Pt #4	Pt #5
Sex	M	M	M	M	F
Age at presentation	74	70	39	69	28
Neurological disease	Myasthenia Gravis	Parkinson disease	Charcot Marie Tooth syndrome	Autoimmune Demyelinating Neuropathy	Allgrove syndrome, motor neurone disease
Duration of symptoms (months)	24	24	18	60	12
Main symptom at prresentation	Dysphagia	Dysphagia	Dysphagia	Dysphagia	Dysphagia
Symptom score pre	17	17	5	17	6
Radiological Stage	3	2	2	2	1
Manometric Pattern	1	1	1	3	1
Hospital stay (days)	4	4	4	3	4
Postoperative complications (surgical)	No	No	No	No	No
Postoperative complications (neurological)	Transitory diplopia	No	No	Acute urinary retention	No
Failure	No	No	No	No	No
Timing of failure (months)	-	-	-	-	-
Failure treatment	-	-	-	-	-
Follow up time (months)	16	33	7	7	12
Symptom score post	6	0	0	6	0
Postoperative GERD (24 h pH-monitoring)	No	No	No	Yes	No

P29 | Evaluation of Effectiveness of Different Anti-Reflux Surgery for the Treatment Extra-Esophageal Symptoms of Gerd

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Aim: Extra-esophageal symptoms are caused by laringo-pharingeal reflux (LPR) which is lead to the backflow into the aero-digestive tract mainly of weakly-acidic or non-acidic gastro-esophageal refluxes. For this reason, it is not fully treated by PPI, but the effectiveness of surgery for these symptoms is still controversial. Aim of our study is to assess the efficacy of surgery on LPR symptoms and identify the best technique among the ones in use.

Methods: From June 2007 to December 2017, 66 patients with LPR underwent surgery. The techniques involved were a total Nissen fundoplication (18), a partial Toupet fundoplication (29) and esophageal magnetic sphincter augmentation (MSA) implant (19). Evaluation of efficacy was performed with Reflux Symptom Index (RSI) specific for extraesophageal symptoms, subjective satisfaction and occurrence of dysphagia and gas-bloat syndrome. A RSI score > 12 was considered as pathological.

Results: RSI significantly decreased after surgery (14.53 ± 3.746 Vs 3.394 ± 4.914), difference of RSI score before and after surgery are shown in table 1 and found out better results for Toupet and MSA as compared with total fundoplication; 83,3% of patients were satisfied with surgery: a comparison between techniques showed superiority of MSA for symptoms control compared with the other two (94.7% Vs 79.2%; *P* = 0.0372), while the two fundoplications were equivalent (82.8 and 78.8%; *P*: 0.8189). A higher incidence of dysphagia occur after Nissen and MSA compared with Toupet (22 Vs 6.9%; *P* = 0.02). Gas bloat symptoms rate is lower with MSA (5.2 vs 30%; *P* = 0.0041).

Conclusion: Anti-reflux surgery is effective not only for typical symptoms of GERD, but also for extra-esophageal symptoms. Among the different techniques offered, a partial fundoplication and MSA implant seems to offer better results in terms of symptom resolution, with fewer complication. A tailored approach based on preoperative clinical and manometric data, should be offered to enhance patient's satisfaction.

	Difference in RSI before and after surgery (mean ± SD)	
Toupet vs Nissen	-11.45 ± 0.6651 vs -9.263 ± 0.8278	*P* = 0.0421
MSA vs Nissen	-12.61 ± 0.805 vs -9.263 ± 0.8278	*P* = 0.0050
Toupet vs MSA	-11.45 ± 0.6651 vs -12.61 ± 0.805	*P* = 0.2737