**Supplemental material**

**Figure S1. Flow of patients.** Flow of patients for study inclusion and completion of additional testing, treatment, and follow-up. FLIP – functional lumen imaging probe; HRM – high-resolution manometry; CCv4.0 - Chicago Classification version 4.0; EGJOO – esophagogastric junction outflow obstruction; BEDQ – brief esophageal dysphagia questionnaire; ES – Eckardt score; PD – pneumatic dilation; POEM – peroral endoscopic myotomy; LHM – laparoscopic Heller’s myotomy.

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**Figure S2. Clinical outcome defined by Eckardt score dysphagia item, by treatment approach and FLIP Panometry motility classification among patients with manometric EGJ outflow obstruction (EGJOO) per Chicago Classification v4.0.** Among patients with normal EGJ opening, 2/3 (67%) with achalasia-type treatment (both treated with botulinum toxin injection) had a good outcome (i.e. dysphagia score 0 or 1), while 80% (8/10 patients) with non-achalasia type treatment had a good outcome. Among patients with a HRM+FLIP Panometry impression of ‘conclusive EGJOO’, 88% (38/43) had a good outcome after achalasia-type treatment, while 17% (2/12) patients had a good outcome after non-achalasia type treatment. LES – lower esophageal sphincter; POEM – peroral endoscopic myotomy; CR – contractile response. Figure used with permission from the Esophageal Center of Northwestern.

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**Figure S3. Clinical outcomes by treatment approach and additional complementary test results among patients with manometric EGJ outflow obstruction per Chicago Classification v4.0.** LES – lower esophageal sphincter; POEM – peroral endoscopic myotomy; IRP – integrated relaxation pressure; PEP – panesophageal pressurization. Figure used with permission from the Esophageal Center of Northwestern.

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**Table S1. Clinical characteristics by FLIP Panometry Motility classification among patients with EGJ outflow obstruction on high resolution manometry (HRM). \***P<0.05, \*\*P<0.001 on comparison between five FLIP Panometry motility classifications. a P=0.052.

BEDQ – CR – contractile response; Brief Esophageal Dysphagia Questionnaire; IRP – integrated relaxation pressure; PEP – panesophageal pressurization.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **FLIP motility classification** | **Normal** | **Weak** | **Obstruction with weak CR** | **Spastic-reactive** | **Inconclusive** |
| **Patient characteristics** |  |  |  |  |  |
| n (%) | 20 (14) | 10 (7) | 49 (35) | 19 (14) | 41 (29) |
| Age, mean (SD) years\* | 51 (15) | 66 (13) | 58 (15) | 67 (9) | 60 (14) |
| Sex; n (%) female | 13 (65) | 7 (70) | 23 (47) | 11 (58) | 25 (61) |
| **Additional baseline testing** |  |  |  |  |  |
| HRM, median supine IRP, mmHg, median (IQR)\* | 21 (18-28) | 23 (20-26) | 28 (22-35) | 24 (20-32) | 22 (18-26) |
| HRM, median upright IRP, mmHg, median (IQR)\*\* | 18 (15-24) | 19 (13-25) | 32 (21-37) | 22 (17-35) | 20 (17-27) |
| HRM, Basal EGJ pressure (end-expiration), mmHg, median (IQR)\* | 36 (22-45) | 21 (14-26) | 32 (22-52) | 31 (20-45) | 30 (19-36) |
| HRM EGJ morphology, n (%)  Type I  Type II or III | 15 (75)  5 (25) | 5 (50)  5 (50) | 42 (86)  7 (14) | 14 (74)  5 (26) | 34 (83)  7 (17) |
| HRM-primary peristalsis/contractility pattern, n (%)\*  Normal  Ineffective  Hypercontractile  Premature | 17 (85)  0  2 (10)  1 (5) | 9 (90)  1 (10)  0  0 | 24 (49)  5 (10)  8 (16)  12 (25) | 7 (37)  1 (5)  3 (16)  8 (42) | 22 (53)  0  8 (20)  11 (27) |
| HRM-rapid drink challenge (RDC)  RDC-IRP, mmHg, median (IQR)\*\*  RDC-IRP > 12mmHg, n (%)\*  PEP>30mmHg, n (%)\*\*  --  HRM-RDC IRP and PEP, n (%)\*\*  RDC-IRP<12mmHg AND PEP absent  RDC-IRP>12mmHg or PEP present (not both)  RDC-IRP>12mmHg AND PEP present | [n=19]  7 (4-13)  5 (26)  5 (26)  --  11 (58)  6 (32)  2 (11) | [n=8]  11 (9-14)  3 (38)  2 (25)  --  5 (63)  1 (13)  2 (25) | [n=44]  16 (11-27)  31 (71)  34 (79)  --  4 (9)  14 (33)  25 (58) | [n=17]  11 (7-15)  7 (41)  15 (88)  --  1 (6)  10 (59)  6 (35) | [n=38]  12 (9-16)  16 (42)  24 (63)  --  9 (24)  18 (47)  11 (29) |
| Timed barium esophagram, n (%)\*  5 min column >5cm  1 min column >5cm OR tablet impaction  Normal | [n=11]  0  2 (18)  9 (82) | [n=6]  0  1 (17)  5 (83) | [n=24]  13 (54)  9 (38)  2 (8) | [n=11]  2 (18)  8 (73)  1 (9) | [n=12]  1 (8)  5 (42)  6 (50) |
| **Baseline symptom scores** |  |  |  |  |  |
| [completed Eckardt score]  Eckardt score, median (IQR)  Eckardt score ≥3, n (%) | [n=16]  3 (2-7)  11 (69) | [n=7]  3.5 (2-4)  5 (71) | [n=33]  6 (3-7)  28 (85) | [n=15]  5 (3-7)  13 (87) | [n=34]  4 (3-6)  25 (74) |
| [completed BEDQ]  BEDQ score, median (IQR)a  BEDQ score ≥10 n (%)\* | [n=17]  10 (5-18)  9 (53) | [n=8]  5 (1-5)  1 (13) | [n=35]  16 (8-23)  26 (74) | [n=17]  17 (11-23)  14 (82) | [n=36]  18 (9-23)  27 (75) |
| [completed GerdQ]  GerdQ score, median (IQR)  GerdQ score ≥9, n (%) | [n=17)  9 (6-11)  10 (59) | [n=7]  9 (6-11)  4 (57) | [n=33]  9 (8-12)  23 (70) | [n=14]  9 (8-10)  7 (50) | [n=31]  7 (6-10)  13 (42) |