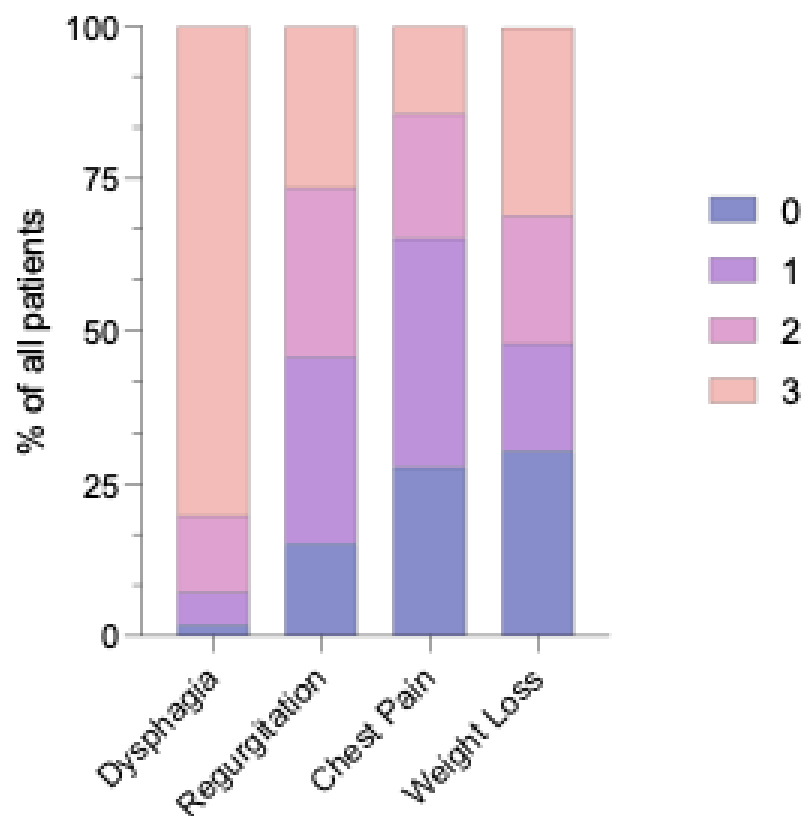
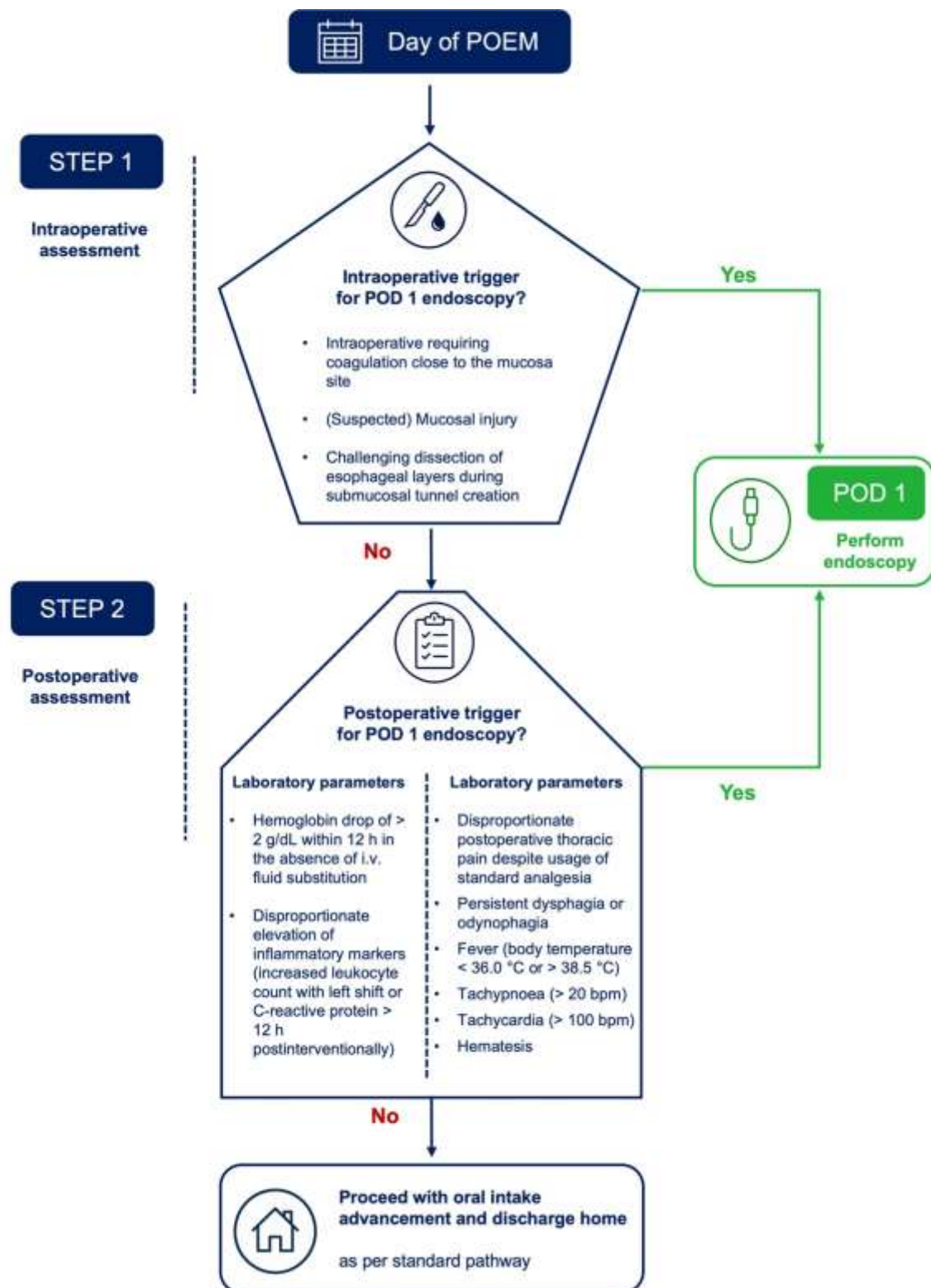




Supplementary Figure 1 Eckardt score characteristics. Bar charts show the distribution of point categories (0-3) for the individual Eckardt score components (dysphagia, regurgitation, chest pain, and weight loss). Values are presented descriptively as percentages.



Supplementary Figure 2 Proposed decision-making algorithm for selective risk-adapted postoperative day 1 endoscopy following peroral endoscopic myotomy. I.v.: Intravenous; POD: Postoperative day; POEM: Peroral endoscopic myotomy.

Supplementary Table 1 Standardized inspection protocol for postoperative day 1 endoscopy

Components	Criteria
Esophageal inspection	a) Clearance of the esophagus (presence of foam, gastric fluid) b) Gross, visual evaluation of esophageal motility c) Evaluation of adequate closure of the mucosal entry site d) Assessment of the integrity of the esophageal mucosa starting from the entry to the cardia e) Assessment of Z-line and gastroesophageal junction, level of cardiac closure f) Ease of passage across the gastroesophageal junction g) Documentation of any submucosal swelling or hematoma along the submucosal tunnel
Routine gastric inspection	Examination of Antrum, Corpus and Fundus Inclusion of retroflexion to evaluate the fundus and cardia with attention to mucosal integrity, cardia closure and potential submucosal bleeding
Routine assessment of pylorus and pylorus passage	
Routine assessment of duodenum	

Postoperative day (POD) 1 endoscopy was generally performed under deep sedation using propofol or esketamine/midazolam with continuous monitoring of vital parameters. All examinations were conducted by a dedicated team of experienced endoscopists (board certified gastroenterologists or general surgeons with > 3 years

of special endoscopic training) familiar with the expected spectrum of normal postoperative endoscopic findings following peroral endoscopic myotomy.

Supplementary Table 2 Definition and management of intervention requiring findings during postoperative day 1 endoscopy

Definition/Type	Handling
Insufficient entry closure	Closure with additional hemoclip application
Mucosal defects with signs of bleeding	Achievement of hemostasis with hemoclip application Patients receiving EVT were reevaluated three days later. Laboratory parameters were assessed every second day Earlier reassessment: (a) relevant clinical findings (b) abnormal laboratory results requiring follow-up (e.g., elevated inflammatory markers)
Mucosal defects with obvious perforation	Antibiotic coverage and EVT or surgical revision upon interdisciplinary decision; Patients receiving EVT were reevaluated three days later
Superficial mucosal injury/ulcer in distal esophagus or cardia	Antibiotic coverage (Unacid) for 5 days; Endoscopic reevaluation within 2-3 days
Asymptomatic submucosal hematoma	Reevaluation within 2-3 days
Symptomatic submucosal hematoma	Either treated conservatively with placement of a nasogastric tube until spontaneous resolve or endoscopic drainage upon interdisciplinary decision
Pylorospasm and signs of compromised gastric emptying	Endoscopic dilatation of the pylorus or temporary placement of a Trilumina probe

The decision to perform an endoscopic intervention was made based on the combination of endoscopic findings and the clinical context, and ultimately determined through interdisciplinary team discussion.

Supplementary Table 3 List of predefined criteria triggering selective postoperative day 1 endoscopy

Subgroups	Criteria
Procedural indications	a) Any intraoperative bleeding requiring coagulation close to the mucosa site b) (Suspected) Mucosal injury distant to the mucosal entry site c) Challenging dissection of esophageal layers during submucosal tunnel creation, particularly in patients with prior (endoscopic) treatment and associated submucosal fibrosis upon judgement of the endoscopic surgeon
Postoperative triggers	
Laboratory abnormalities*	a) Hemoglobin drop of > 2 g/dL within 12 h in the absence of i.v. fluid substitution b) Disproportionate elevation of inflammatory markers (increased leukocyte count with left shift or C-reactive protein > 12 h postinterventionally)
Clinical symptoms	a) Disproportionate postoperative thoracic pain despite usage of standard analgesia b) Persistent dysphagia or odynophagia c) Fever (body temperature < 36.0 °C or > 38.5 °C)

- d) Tachypnoea (> 20 bpm)
- e) Hematemesis

*Routine laboratory tests were usually obtained on the morning of postoperative day 1 (approximately 16 h after the intervention). i.v.: Intravenous.

Supplementary Table 4 Variables included in univariable and multivariable analyses

Analysis	Included variables
Univariable analysis of iAEs	• Age • ASA status • Anticoagulation • BMI < 18.5 • BMI > 30 • TTS • Achalasia type • Previous endoscopic treatment (pneumatic dilatation and/or botulinum toxin injection) • Previous pneumatic dilatation • Previous botulinum toxin injection • Previous myotomy • Myotomy length • Myotomy rate (min/cm myotomy) • Procedural experience thresholds (case number < 25, < 50, < 100, < 200)
Multivariable analysis of iAEs	• Anticoagulation • BMI < 18.5 • BMI > 30 • TTS*

Univariable analysis of pathological findings in EGD	• Achalasia type • Previous endoscopic treatment • Previous myotomy • Myotomy length • Myotomy rate • Procedural experience threshold (< 25 procedures)
Multivariable analysis of pathological findings in EGD	• ASA status • Age • ES • TTS • BMI >30 • BMI <18.5 • Previous endoscopic treatment • Previous pneumatic dilatation • Previous botulinum toxin injection • Achalasia type • Myotomy length • Myotomy rate • Procedural experience thresholds (< 100, < 200 procedures) • iAE • Specified iAE: bleeding or mucosal lesion
Multivariable analysis of pathological findings in EGD	• TTS • BMI > 30 • BMI < 18.5

- Achalasia type
- Myotomy length
- iAE
- Intraoperative bleeding from mucosal lesion

ASA: American Society of Anesthesiologists; BMI: Body mass index; EGD: Esophagogastroduodenoscopy; ES: Eckardt score; iAE: Intraoperative adverse event; TTS: Time to surgery.

Supplementary Table 5 Postoperative complications (Clavien-Dindo grade $\geq$ IIIa)

Clavien-Dindo grade	Kind of complication, clinical symptoms, and treatment
IVb	CPR with SIRS and AKI, sepsis due to HOPS and UTI
IVb	Bronchial fistula requiring Clip, EVT, and finally distal esophageal resection; stay in ICU with ECMO supply
IVa	Respiratory and circulatory insufficiency, hypothermia
IVa	Allergic reaction to an unknown agent
IIIb	Extensive (sub)mucosal hematoma requiring surgical revision
IIIa	Minimal lesion at the mucosal entry requiring additional endoscopic clip placement
IIIa	Partial clip retraction on endoscopic control requiring clip replacement
IIIa	Pneumothorax, mucosal lesion requiring EVT and antibiotic treatment
IIIa	Esophageal ulcer requiring stent implantation, ICU monitoring, and diagnostic pleural punctation
IIIa	Minimal mucosal dehiscence requiring an endoscopic clip placement

IIIa	Bleeding from the submucosal tunnel toward the cardia, resulting in a cardia wall defect requiring clip placement and adrenaline application
IIIa	Small mucosal lesion at the gastroesophageal junction requiring clip placement
IIIa	Postoperative small subcardial ulcer requiring OTSC clip application

AKI: Acute kidney injury; CPR: Cardiopulmonary resuscitation; ECMO: Extracorporeal membrane oxygenation; EVT: Endoscopic vacuum therapy; HOPS: Hospital-acquired pneumonia; ICU: Intensive care unit; OTSC: Over-the-scope; SIRS: Systemic inflammatory response syndrome; UTI: Urinary tract infection.

Supplementary Table 6 Complete regression outputs - univariable analysis for intraoperative adverse events

Factor	OR (95%CI)	P
ASA	0.69 (0.31–1.54)	0.363
BMI < 18.5	1.05 (0.42–2.62)	0.913
BMI > 30	2.34 (1.04–5.24)	0.040
OP Nr. < 100	0.93 (0.47–1.86)	0.844
OP Nr. < 200	0.51 (0.16–1.58)	0.242
OP Nr. < 25	2.17 (1.13–4.14)	0.020
OP Nr. < 50	1.76 (0.93–3.35)	0.084
TTS	1.31 (1.08–1.59)	0.005
Achalasia type II <i>vs</i> I	1.06 (0.41–2.72)	0.910
Achalasia type III <i>vs</i> I	1.94 (0.69–5.47)	0.209
Age	0.94 (0.59–1.51)	0.811
Anticoagulation	1.25 (0.42–3.74)	0.692
Myotomy length	1.47 (1.00–2.18)	0.051
Myotomy rate	1.44 (1.15–1.81)	0.002
Prev. botox	0.50 (0.12–2.15)	0.349
Prev. dilatation	1.47 (0.73–2.95)	0.280

Factor	OR (95%CI)	P
Prev. endoscopy	1.21 (0.61–2.38)	0.585
Prev. myotomy	3.68 (0.69–19.59)	0.127

ASA: American Society of Anesthesiologists; BMI: Body mass index; CI: Confidence interval; ES: Eckardt score; OP Nr.: number of procedures performed; OR: Odds ratio; Prev.: Previous; TTS: Time to surgery.

Supplementary Table 7 Complete regression outputs - multivariable analysis for intraoperative adverse events

Factor	OR (95%CI)	P
BMI < 18.5	1.86 (0.65–5.29)	0.247
BMI > 30	3.78 (1.36–10.52)	0.011
OP Nr. < 25	2.08 (0.96–4.51)	0.064
TTS	1.05 (0.82–1.34)	0.703
Achalasia type II <i>vs</i> I	2.09 (0.64–6.86)	0.222
Achalasia type III <i>vs</i> I	2.07 (0.56–7.72)	0.277
Anticoagulation	1.30 (0.37–4.55)	0.682
Myotomy length	2.46 (1.48–4.08)	< 0.001
Myotomy rate	1.78 (1.30–2.44)	< 0.001
Prev. Endoscopy	1.50 (0.65–3.42)	0.339
Prev. Myotomy	2.23 (0.32–15.33)	0.415

BMI: Body mass index; CI: Confidence interval; OP Nr.: number of procedures performed; OR: Odds ratio; Prev.: Previous; TTS: Time to surgery.

Supplementary Table 8 Complete regression outputs - univariable analysis for endoscopic pathological findings on postoperative day 1 endoscopy

Factor	OR (95%CI)	P
ASA	0.85 (0.35–2.04)	0.713
BMI < 18.5	3.40 (1.56–7.42)	0.002
BMI > 30	1.25 (0.46–3.39)	0.665

Factor	OR (95%CI)	P
ES	0.96 (0.54–1.71)	0.894
OP Nr. < 100	0.45 (0.22–0.91)	0.026
OP Nr. < 200	0.10 (0.01–1.60)	0.103
TTS	1.23 (1.00–1.52)	0.050
Achalasia type II <i>vs</i> I	0.35 (0.16–0.80)	0.012
Achalasia type III <i>vs</i> I	0.50 (0.19–1.35)	0.172
Age	1.00 (0.60–1.65)	0.993
Intraop. adverse event	4.81 (2.16–10.72)	< 0.001
Intraop.bleeding/mucosal lesion	9.40 (3.95–22.41)	< 0.001
Myotomy length	0.82 (0.52–1.29)	0.390
Myotomy rate	1.55 (1.21–1.98)	< 0.001
Prev. Botox	1.70 (0.62–4.68)	0.307
Prev. Dilatation	1.19 (0.55–2.57)	0.652
Prev. Endoscopy	1.00 (0.48–2.11)	0.995

ASA: American Society of Anesthesiologists; BMI: Body mass index; CI: Confidence interval; ES: Eckardt score; OP Nr.: number of procedures performed; OR: Odds ratio; Prev.: Previous; TTS: Time to surgery.

Supplementary Table 9 Complete regression outputs - multivariable analysis for endoscopic pathological findings on postoperative day 1 endoscopy

Factor	OR (95%CI)	P
BMI < 18.5	4.30 (1.72–10.77)	0.002
BMI > 30	1.56 (0.50–4.89)	0.448
TTS	1.24 (0.97–1.57)	0.081
Achalasia type II <i>vs</i> I	0.34 (0.13–0.84)	0.019
Achalasia type III <i>vs</i> I	0.35 (0.11–1.17)	0.090
Intraop adverse event	4.81 (2.16–10.72)	< 0.001
Intraop bleeding/mucosal lesion	9.40 (3.95–22.41)	< 0.001
Myotomy length	1.11 (0.65–1.89)	0.699

BMI: Body mass index; CI: Confidence interval; OP Nr.: number of procedures performed; OR: Odds ratio; Prev.: Previous; TTS: Time to surgery.

Supplementary Table 10 2 × 2 contingency table of intraoperative adverse events to intervention requiring pathological findings in programmed postoperative day 1 endoscopy

Group	Intervention- requiring finding	No intervention requiring finding	Total	Risk, %
iAE	4	38	42	9.5
No iAE	3	350	353	0.85
Total	7	388	395	1.8

CI: Confidence interval; iAE: intraoperative adverse event.

Supplementary Table 11 Measures of association of intraoperative adverse events to intervention requiring pathological findings in programmed postoperative day 1 endoscopy

Measure	Estimate (95%CI)	<i>P</i>
Absolute risk difference	8.7% (1.4–16.0)	—
Relative risk	11.2 (2.6–47.6)	—
Odds ratio	12.3 (2.5–59.8)	0.027*

*Fisher's exact test. CI: Confidence interval.

Supplementary Table 12 Diagnostic performance of intraoperative adverse events to intervention requiring pathological findings in programmed postoperative day 1 endoscopy

Metric	Value (95%CI)
Sensitivity	57.1% (25.0–84.2)
Specificity	90.2% (86.6–92.9)
Positive predictive value	9.5% (3.8–22.1)
Negative predictive value	99.2% (97.6–99.8)

CI: Confidence interval.

