Assessing Gastric Mucosal Visibility: Impact of GLP-1RA Therapy

Justin S. Routman MD MSHA, Ramzi Mulki MD, Malcom B. Chapman MD, Dalton A. Norwood MD, Basma Abdulhadi MD, Kondal R. Kyanam Kabir Baig MD, Ali M. Ahmed MD, Shajan Peter MD, Sergio A. Sanchez-Luna MD, **Elizabeth W Duggan MD**

University of Alabama at Birmingham

Corresponding author:
Justin S Routman
jroutman@uabmc.edu

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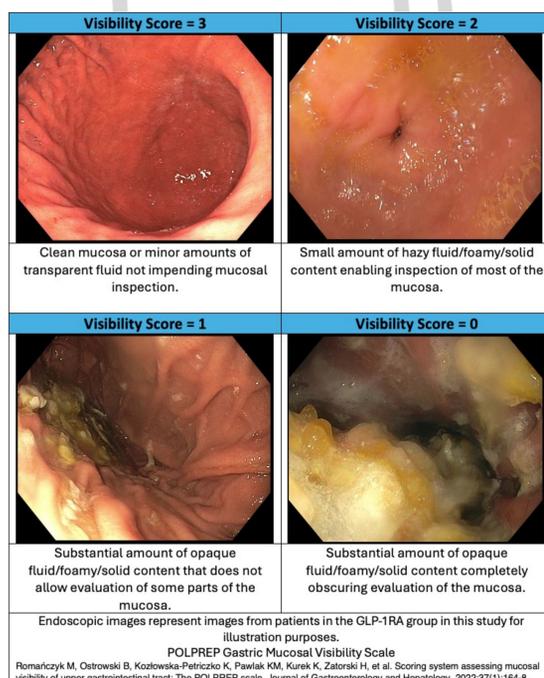The University of Alabama at Birmingham

BACKGROUND

- There has been a surge in the use of glucagon-like peptide-1 receptor agonists (GLP-1RAs) to manage Type 2 Diabetes Mellitus (T2DM).
- A recent FDA-approved indication of GLP-1RAs for weight loss has expanded usage for obesity management.
- The growing number of GLP-1RA users has potential perioperative implications.
- The American Society of Anesthesiologists & the American Gastroenterological Association acknowledge limited evidence on GLP-1RA-induced delayed gastric emptying published guidance statements.
- Direct visualization studies on gastric emptying have reported mixed findings.
- Standardized assessment methods are needed to evaluate GLP-1RA effects on gastric function and emptying.

INITIATIVE

- Our goal was to assess GLP-1RA impact on gastric content retention & mucosal visibility using a validated scale in patients undergoing esophagogastroduodenoscopy (EGD).
- The primary outcome was retention of gastric contents and gastric mucosal visibility scores.
- These were assessed using a clinically-relevant combination of the validated POLPREP scale and a qualitative scale (clean, residue, bezoar).
- Secondary outcomes included procedures aborted due to inadequate visibility, the need for emergent intubation, & pulmonary aspiration.

POLPREP SCALE

| Visibility Score = 3 | Visibility Score = 2 |
Clean mucosa or minor amounts of transparent fluid not impending mucosal inspection. | Small amount of hazy fluid/foamy/solid content enabling inspection of most of the mucosa.

| Visibility Score = 1 | Visibility Score = 0 |
Substantial amount of opaque fluid/foamy/solid content that does not allow evaluation of some parts of the mucosa. | Substantial amount of opaque fluid/foamy/solid content completely obscuring evaluation of the mucosa.

Endoscopic images represent images from patients in the GLP-1RA group in this study for illustration purposes.
POLPREP Gastric Mucosal Visibility Scale
Romańczyk M, Ostrowski B, Kozlowska-Petriczko K, Pawlak KM, Kurek K, Zatorski H, et al. Scoring system assessing mucosal visibility of upper gastrointestinal tract: The POLPREP scale. Journal of Gastroenterology and Hepatology. 2022;37(1):164-8

- The validated POLPREP is a 4-point numerical scale that assesses mucosal cleanliness during EGD, scoring the esophagus, stomach, and duodenum separately.
- Scores range from zero to three, where a score of 0 represents poor visibility and a score of 3 represents excellent visibility.
- Gastric mucosal visibility using the POLPREP scale was assessed by a single blinded gastroenterologist to ensure consistency, mitigate inter-rater variability, and enhance data reliability.

RESEARCH DESIGN

- Study period: June 2017 – September 2023
- Single academic quaternary care referral center
- Retrospective 1:1 matched pair case-control study
- Exclusion criteria included a history of gastric anatomy-altering surgery, EGD scheduled with concurrent colonoscopy, active GI hemorrhage requiring intervention, and incomplete data/records/images.
- Cases were matched with controls using a nearest-neighbor propensity score for age, gender, race, and T2DM status.

STUDY COHORT

- During the study period, 7,735 EGDs were performed. Of those, 353 patients were receiving GLP-1RA therapy.
- After exclusion and matching, **168 individuals (84 users and 84 non-users) were included in the final analysis.**
- The study cohort was predominantly female (71.4%) and white (59.5%), with a median (IQR) age of 55 (43-64.5).
- The indication for GLP-1RA was predominantly T2DM (88%) vs weight loss (12%).
- There were no significant differences in ASA status, prevalence of gastroparesis, T2DM, or cirrhosis between groups, though GLP-1RA users exhibited a higher percentage of HbA1c levels <7% (*NS*) and lower percentage of insulin use (*NS*) vs non-users.
- Time since last oral intake did not vary significantly between groups for solids or liquids.

RESULTS

- **The mean (SD) POLPREP mucosal visibility score was higher (worse) in the GLP-1RA group** vs the non-GLA-1RA group: 2.14 (1.03) vs 2.57 (0.74), MD: 0.42±0.13, t=3.08, F=166, p<0.01.
- **GLP-1RA users had a 2.54 times higher odds of a lower visibility score** than non-users (95% CI: 1.37-4.68, p<0.01).
- **Higher BMI was significantly associated with lower visibility scores** (aOR 1.15, p<0.001). Subanalysis revealed increased odds of lower visibility scores among obese individuals (cOR 6.88, p=0.001) but not among those who were overweight (*NS*).
- **There was a higher likelihood of aborted procedures in the GLP-1RA group** (4.8% vs 0%, p<0.05).
- GLP-1RA users more frequently received MAC (76% vs 58%, p=0.014) vs conscious sedation.
- The above findings were consistent across all GLP-1RA agents.

Crude and adjusted odds ratios for patient characteristics and procedural outcomes

Characteristic	Frequencies*		Crude Model				Adjusted Model			
	Non-GLP-1RA	GLP-1RA	cOR	95% CI		P-value	aOR	95% CI		P-value
Age			1.00	0.97	1.03	0.953	1.02	0.99	1.06	0.171
Gender: Male	26 (31.0%)	24 (28.6%)	0.89	0.46	1.73	0.736	1.07	0.49	2.35	0.860
Race: Black	33 (39.3%)	34 (40.5%)	1.05	0.57	1.95	0.875	0.72	0.33	1.54	0.393
Gastroparesis	8 (9.5%)	2 (2.4%)	0.23	0.05	1.13	0.070	0.46	0.08	2.59	0.375
T2DM	71 (84.5%)	73 (86.9%)	1.22	0.51	2.89	0.660	0.79	0.28	2.24	0.664
BMI			1.08	1.05	1.12	<0.001	1.10	1.05	1.15	<0.001
BMI: Over-weight	19 (22.6%)	12 (14.3%)	2.68	0.73	9.92	0.139				
BMI: Obese	42 (50.0%)	68 (81.0%)	6.88	2.17	21.84	0.001				
Gastric Cleanliness										
Clean	57 (67.9%)	48 (57.1%)	Reference				Reference			
Residue	23 (27.4%)	25 (29.8%)	1.29	0.65	2.56	0.465	1.25	0.57	2.74	0.582
Retained contents	4 (4.8%)	11 (13.1%)	3.27	0.98	10.92	0.055	4.62	1.21	17.57	0.025
Gastric Mucosal Visibility Score (POLPREP Scale)										
Three (3)	58 (69.0%)	40 (47.6%)	Reference				Reference			
Two (2)	19 (22.6%)	27 (32.1%)	2.06	1.01	4.20	0.047	8.14	1.84	36.05	0.006
One (1)	4 (4.8%)	6 (7.1%)	2.18	0.58	8.21	0.251	2.04	0.45	9.31	0.355
Zero (0)	3 (3.6%)	11 (13.1%)	5.32	1.39	20.28	0.014	2.42	1.07	5.49	0.034

T2DM: Type 2 Diabetes Mellitus; BMI: Body Mass Index; *Values are n(%) unless otherwise stated

OUTCOMES & SAFETY

- Results demonstrated that **GLP-1RA use was associated with increased odds of lower visibility score and retained gastric contents.**
- **Retained gastric contents were more prevalent in the GLP-1RA group** (13.1% vs 4.8%, aOR: 4.62, p=0.025), with all four aborted procedures due to retained contents occurring in this group (p=0.043).
- There were no significant differences in procedure-related or anesthesia-related adverse events.
- **No patients in either group experienced pulmonary aspiration or required emergent intubation.**
- Balancing glycemic control benefits with risks of delayed gastric emptying is critical in clinical decision-making.

LIMITATIONS

- Generalizability is limited by single-center study design and population demographics.
- The small size of the study limited our ability to completely match for BMI between groups, and GLP-1RA users had a higher BMI compared to non-users (40.7 vs 31.2, p<0.001). Higher BMI is a known independent risk factor for delayed gastric emptying.
- Our institution transitioned from gastroenterologist-directed conscious sedation to monitored anesthesia care at one endoscopy site during the study period, which may have influenced procedural outcomes in unpredictable ways.
- There are inherent limitations of retrospective data analysis and potential selection bias
- There may be potential biases due to propensity score matching

CONCLUSIONS

- Individuals using GLP-1RAs undergoing EGD exhibited an increased odds of lower POLPREP gastric mucosal visibility scores, a higher incidence of retained contents, and a higher incidence of aborted procedures.
- Further studies are warranted to validate these findings.
- These results highlight significant implications for perioperative medication management, screening, and fasting instructions in this unique population.

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