

Adenoma and Sessile Serrated Polyp Detection Rates in Adults Using Glucagon-Like Peptide-1 Receptor Agonists

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INTRODUCTION: Glucagon-like peptide-1 receptor agonists (GLP-1RA) are increasingly used for managing diabetes and obesity. Although they improve glycemic control, they also delay gastrointestinal motility, potentially leading to inadequate bowel preparation for colonoscopy, which can increase the risk of missed lesions. This study aimed to evaluate the impact of GLP-1RA use on the quality of bowel preparation and on adenomas and sessile serrated polyp (SSP) detection.

METHODS: We conducted a retrospective cohort study of outpatient screening and surveillance colonoscopies at a tertiary academic medical center. Adults who used a GLP-1RA within 1 week of their colonoscopy formed the treatment group; patients not on GLP-1RA (nonusers) who never used GLP-1RA served as controls. Propensity score weighting was applied for age, sex, BMI, race, diabetes status, and relevant medications. The subgroup analysis was stratified based on diabetes status and GLP-1RA use.

RESULTS: Among 49,987 patients (4,269 GLP-1RA users, 45,718 nonusers), GLP-1RA use was associated with increased odds of inadequate bowel preparation (odds ratio [OR] 1.23, 95% confidence interval [CI] 1.04–1.46). No significant difference in SSP and adenoma detection was observed. In subgroup analysis, GLP-1RA users with diabetes had the highest odds of inadequate preparation (OR 1.88, 95% CI 1.59–2.24) and the lowest odds of SSP detection (OR 0.71, 95% CI 0.57–0.89).

DISCUSSION: GLP-1RA use, particularly among patients with diabetes, is associated with higher odds of inadequate bowel preparation and lower SSP detection, whereas adenoma detection was unaffected. Tailored bowel-prep protocols for GLP-1RA users with diabetes should be evaluated prospectively.

KEYWORDS: GLP-1RA; bowel preparation; sessile serrated polyp; adenoma detection; diabetes

ABBREVIATIONS: ADR, Adenoma detection rate; BMI, Body mass index; CI, confidence interval; CRC, Colorectal cancer; GLP, Glucagon-like peptide; GLP-1RA, Glucagon-like peptide-1 receptor agonists; OR, Odds ratio; SSP, Sessile serrated polyp

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INTRODUCTION

Since the first approval of glucagon-like peptide-1 receptor agonists (GLP-1RA) for type 2 diabetes in 2005, GLP-1RA use has grown significantly for type 2 diabetes and obesity over the past 2 decades. GLP-1RA not only decrease hemoglobin A1c and weight but also improve cardiovascular outcomes, metabolic dysfunction-associated liver disease, and chronic kidney disease (1–9). These benefits are because of their multifaceted mechanisms, which include increasing glucose dependent insulin

release, suppressing increase of glucagon after meals, and delaying gastric and intestinal motility (10).

Colorectal cancer (CRC) is the second leading cause of cancer deaths in the United States and colonoscopy is considered the gold standard for CRC screening to detect and resect colon polyps (11). Adenoma and sessile serrated polyp (SSP) detection rates have increased over time because of various factors including advances in endoscopist techniques and increased attention to high-quality bowel preparation (12). Approximately 15 million

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colonoscopies are performed in the United States each year for both screening and diagnostic purposes (13). A June 2024 poll estimates that 12% of US adults are GLP-1RA users which translates into an estimated 1.8 million adults receiving colonoscopy annually that are GLP-1RA users (14).

Inadequate bowel preparation has been noted with medications such as opiates, tricyclic antidepressants, and in conditions such as constipation and diabetes (15). Delayed gastric and intestinal motility, autonomic neuropathy and hyperglycemia in diabetes have been implicated as factors associated with suboptimal preparation (16–18). Diabetes is also associated with a significantly higher risk of CRC and adenomas, so inadequate preparation in this population poses an increased risk of missed lesions, prolonged procedures, and repeat examinations (16).

Despite their widespread use, there is a paucity of data of quality of colonoscopy preparation and polyp detection rate in patients on GLP-1RA (19–22). To our knowledge, adenoma detection rate (ADR) and SSP detection rate have not been systematically evaluated in this population. Our study aimed to determine the effect of GLP-1RA on bowel preparation and ADR and SSP detection rates.

METHODS

Study design

We performed a propensity score weighted retrospective cohort study of patients undergoing outpatient screening or surveillance colonoscopy at multiple locations within a large integrated health system from January 2020 to September 2023. We included patients actively using GLP-1RA at the time of colonoscopy, whereas the control group included patients who had never used a GLP-1RA. We evaluated rates of inadequate bowel preparation, ADR and SSP detection rate. Demographic information, medication, and endoscopic findings were retrieved from the EPIC electronic health record by Structured Query Language against the Clarity data warehouse.

Study sample

Participants were classified into 2 groups: patients who were prescribed a GLP-1RA within 1 week of a colonoscopy (cases) and another group of patients that had not been prescribed a GLP-1RA (controls) (Figure 1). GLP-1RA medications included those for either diabetes or weight loss at any dose: liraglutide, exenatide, dulaglutide, semaglutide, tirzepatide, and albiglutide.

Patients were excluded from the analysis if their colonoscopy reports lacked details about the quality of bowel preparation. Exclusions also applied to those who underwent the procedure in an inpatient setting, where urgent colonoscopies may not involve adequate preparation due to unforeseen circumstances. Medication lists were screened in both cases and controls that can modify gastrointestinal motility such as prokinetics, anticholinergics, antidiarrheals, and opioids. Patients prescribed any of these medications remained in the study; these confounding factors were controlled by propensity score weighting during statistical analysis. Demographic and clinical data were extracted, encompassing variables such as age, sex, race/ethnicity, body mass index, presence of diabetes mellitus, obesity, hemoglobin A1c levels, indications for colonoscopy, and the documented quality of bowel preparation. The Data set also included instances where the procedure was aborted due to inadequate preparation, alongside details of the aforementioned medications.

Bowel preparation was evaluated using the Aronchick Scale, a qualitative measure that categorizes preparation into 5 distinct levels: excellent, good, fair, poor, and inadequate. For the purposes of this study, these categories were consolidated into 2 groups: inadequate bowel preparation, which encompassed fair, poor, and inadequate categories, and adequate bowel preparation, which included both excellent and good levels. All patients not having a recorded Aronchick Scale on their procedure report were excluded. The Boston Bowel Preparation Score was not consistently documented in our endoscopy reports during the study period, so we used the Aronchick Scale as the most reliable available measure for bowel preparation quality.

Food and Drug Administration-approved bowel-cleansing regimens used included: polyethylene-glycol solutions (Golytely, Nulytely, Moviprep, Plenvu), osmotic tablets (Sutab, Osmoprep), sodium-phosphate solution (Suprep), sodium-picosulfate/magnesium oxide/citric acid (Clenpiq), and split-dose Gatorade/Miralax combinations.

Statistical analysis

Data were described using median and interquartile range for non-normally distributed continuous variables, and frequency (percentage) for categorical variables. The Wilcoxon rank-sum test, Kruskal-Wallis rank sum test, and χ^2 test were used to compare variables between groups. Propensity score weighting was performed on age, sex, body mass index (BMI), race, diabetes, prokinetics, anticholinergics, antidiarrheal, and opiates to achieve a good covariate balance across groups. Propensity scores were calculated using generalized boosted model, and weights were calculated using inverse probability of treatment weighting method to estimate the average treatment effect on treated. Descriptive statistics and absolute standardized difference were reported before and after propensity score weighting.

Weighted logistic regression analysis was used to assess the association between groups and outcomes: inadequate bowel preparation, adenoma, SSP. Survey R package was used to perform analyses accounting for weights and twang package was used to perform propensity score weighting. Analyses were conducted using R software, and a significance level of 0.05 was assumed for all tests.

Subgroup analysis

We applied propensity score weighting to balance covariates between GLP-1RA users and nonusers, including diabetes status in the weighting model. In addition to this 2-group comparison, we also conducted a stratified analysis using 4 groups based on diabetes and GLP-1RA exposure to further examine subgroup effects.

We performed subgroup analysis specifically stratifying by diabetes status and GLP-1RA therapy because diabetes is independently associated with gastrointestinal dysmotility. This approach allowed us to explore potential effects of diabetes and GLP-1RA use regarding inadequate bowel preparation. Four mutually exclusive subgroups were created based on patients' diabetes status and whether they were receiving GLP-1RA at the time of colonoscopy (Figure 1): (i) nondiabetes, not on GLP-1RA (control), (ii) nondiabetes, on GLP-1RA, (iii) diabetes, not on GLP-1RA and (iv) diabetes, on GLP-1RA.

These subgroups were defined following the same inclusion and exclusion criteria described above (i.e., outpatient procedures with documented bowel preparation quality, no missing information on variables in weighting). We then repeated the

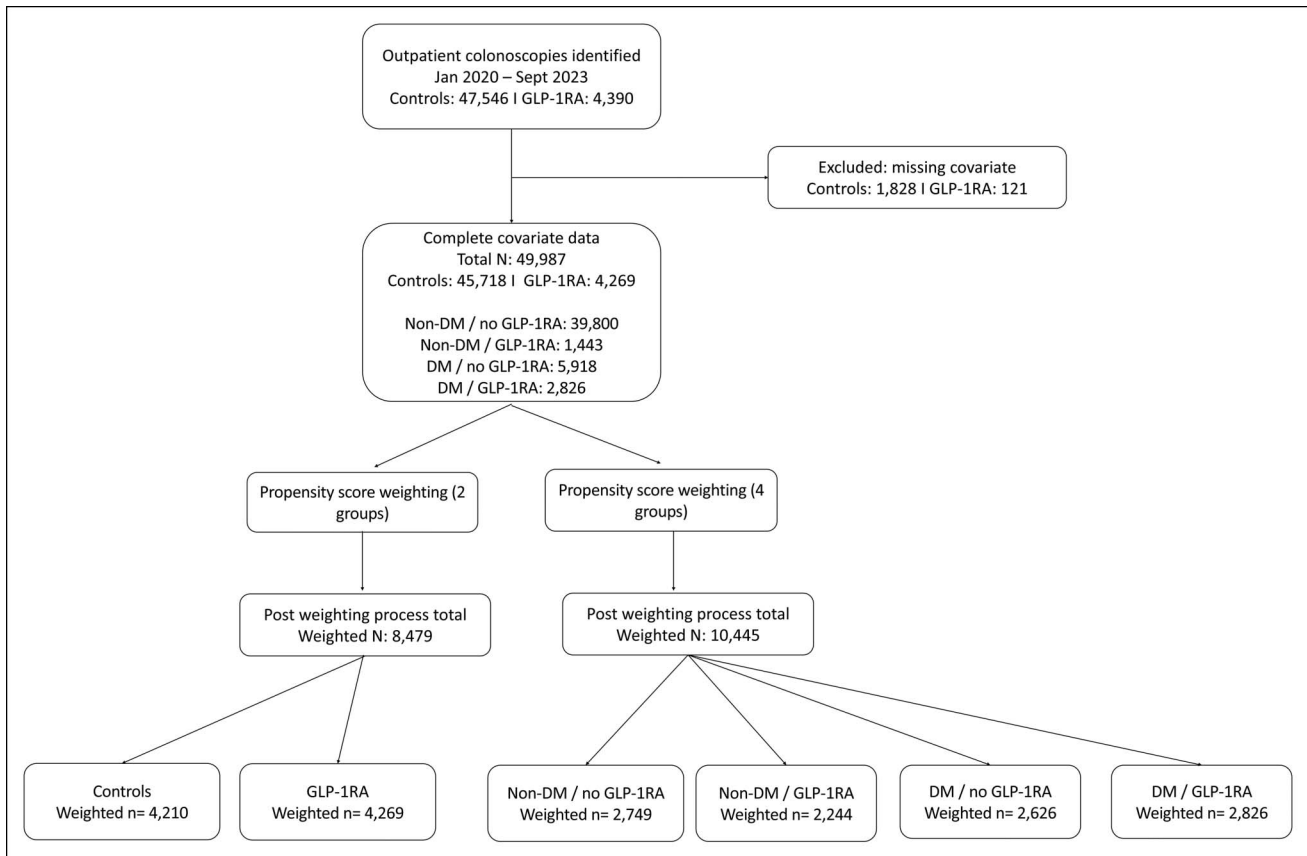


Figure 1. Screening selection and matching process. Outpatient colonoscopies performed between January 2020 and September 2023 ($n = 51,936$) were evaluated for inclusion based on availability of complete covariate data. A total of 1,949 examinations were excluded due to missing covariates. The final cohort included 45,718 controls and 4,269 GLP-1RA users (total $n = 49,987$). Two analytic approaches were used: (i) propensity score weighting by GLP-1RA exposure (2 groups), and (ii) propensity score weighting stratified by diabetes and GLP-1RA use (4 groups). Weighted totals and subgroup distributions are shown for both approaches. GLP-1RA, glucagon-like peptide-1 receptor agonists.

propensity score weighting for these 4 subgroups based on the baseline covariates of age, sex, BMI, race, and the use of prokinetic, anticholinergic, antidiarrheal, and opioid medications. Following weighting, we performed weighted logistic regression analyses to assess the odds of inadequate bowel preparation, adenoma detection, and SSP detection in each subgroup.

RESULTS

Our cohort comprised of 45,718 controls and 4,269 cases (Figure 1). We conducted propensity score weighting to adjust for several covariates. These variables included the basic demographic variables and diagnosis of diabetes, and the use of prokinetics, opiates, anticholinergics, and antidiarrheal medications (Table 1). Polyethylene glycol-based products were used for bowel preparation in over 95% of patients in both groups.

In the weighted cohort, 16.4% of patients on GLP-1RA had inadequate bowel preparation compared with 13.7% in the control group ($P = 0.017$). ADRs were identical at 34.1% in both groups, whereas SSP detection was slightly lower in the GLP-1RA group (5.5%) vs controls (6.4%), although not statistically significant ($P = 0.21$) (Table 2).

Semaglutide was the most frequently used at 41.67%, followed by liraglutide at 19.17%, dulaglutide at 17.34%, tirzepatide at 14.84%, and exenatide at 1.91%. Albiglutide was used least frequently, at only 0.02%.

Patients using GLP-1RA had 23% increase in the odds of inadequate bowel preparation when compared with control patients (odds ratio [OR] 1.23, 95% confidence interval [CI] 1.04–1.46) (Figure 2, Table 3). GLP-1RA use did not significantly alter the detection rate of adenoma (OR 1.00, 95% CI 0.88–1.13) and SSP (OR 0.85, 95% CI 0.65–1.10) (Figure 2, Table 3).

On subgroup analysis, we observed notable differences in bowel preparation quality and polyp detection rates (Figure 3). Baseline characteristics across the 4 mutually exclusive diabetes and GLP-1RA groups were generally well balanced after weighting. Median age and BMI were similar across subgroups, with a slightly higher prevalence of anticholinergic and prokinetic use in GLP-1RA users. The diabetes subgroups showed a greater prevalence of constipation and opioid use compared with nondiabetic patients (Table 4). The analysis showed that patients with diabetes on GLP-1RA exhibited higher rates of inadequate bowel preparation (weighted %: 19.1%) compared with patients without diabetes not on GLP-1RA (weighted %: 11.1%; $P < 0.001$) (Table 5).

In multivariable analysis, patients with diabetes on GLP-1RA had 88% increase in the odds of inadequate bowel prep compared with nondiabetic, non-GLP-1RA users (control; OR 1.88, 95% CI 1.59–2.24) (Table 5).

The odds of detecting SSPs were consistently lower among patients with diabetes on GLP-1RA compared with the other

Table 1. Weighted demographics and baseline characteristics by GLP-1RA groups

Variable	All (N = 49,987)	Control (N = 45,718)	Treatment (N = 4,269)	P value	Absolute standardized difference
Age, yr, median (25th, 75th)	55.0 (50.0, 63.0)	55.0 (50.0, 63.0)	55.0 (50.0, 64.0)	0.81	0.011
Sex, %				0.80	0.007
Male	38.9	39.1	38.7		
Female	61.1	60.9	61.3		
BMI, median (25th, 75th)	35.0 (31.2, 40.3)	35.0 (31.2, 39.9)	35.2 (31.2, 40.6)	0.12	0.057
Race, %				0.80	
White	67.1	66.6	67.5		0.019
Asian	1.1	1.1	1.1		0.002
Black	27.8	28.0	27.6		0.010
Others	4.1	4.3	3.8		0.025
Prokinetics, %	33.7	33.6	33.7	0.96	0.002
Anticholinergics, %	54.2	54.0	54.4	0.73	0.010
Antidiarrheal, %	5.8	5.8	5.9	0.87	0.005
Constipation, %	23.9	23.8	24.0	0.93	0.003
Opiates, %	30.3	30.5	30.1	0.70	0.010
Diabetes, %	66.5	66.9	66.2	0.56	0.015

Weighted demographic and clinical features of patients by GLP-1RA groups. Variables include median (interquartile range) for continuous data, and percentage for categorical data. N = unweighted number. Absolute standardized difference after propensity score weighting was reported. BMI, body mass index; GLP-1RA, glucagon-like peptide-1 receptor agonists.

groups. There was a 29% decrease in odds of SSP detection when compared with controls (OR 0.71, 95% CI 0.57–0.89) (Table 5).

Patients with diabetes who were not on GLP-1RA had the highest observed adenoma prevalence (37.2%) (Figure 3, Table 5). The odds of adenoma detection were not significantly higher in diabetes subgroups: OR 1.13 (95% CI 0.98–1.30) for patients with diabetes not on GLP-1RA and OR 1.09 (95% CI 0.97–1.22) for patients with diabetes on GLP-1RA, each compared with patients without diabetes not on GLP-1RA (controls) (Table 5).

DISCUSSION

In this large, propensity score weighted cohort study, we found that GLP-1RA use was associated with significantly higher odds of inadequate bowel preparation and reduced detection of SSPs but had no significant impact on ADRs in patients with diabetes. After propensity score weighting to adjust for key confounders such as diabetes and medications affecting gastrointestinal motility, patients using GLP-1RA had an 23% higher odds of inadequate bowel preparation compared with nonusers, whereas

patients with diabetes on GLP-1RA had 88% increase in the odds of inadequate bowel preparation.

These findings have important implications for CRC screening and surveillance, especially as GLP-1RA use increases rapidly in populations with diabetes and obesity.

The impact of GLP-1RA on bowel preparation for colonoscopy remains uncertain, with prior studies showing mixed results. A study by Sharma et al (19) in 2017 reported that 126 patients with diabetes using exenatide (both short acting and extended-release formulations) and liraglutide had a satisfactory bowel prep similar to controls without GLP-1RA. However, more recent studies in 2024 and 2025 have found GLP-1RA are independently associated with inadequate bowel preparation (21,22). Yao et al (21) found poor quality bowel preparation in patients on GLP-1RA compared with those not on GLP-1RA. Our findings align with the more recent studies suggesting that GLP-1RA use impairs colonoscopy preparation quality (21,22). Our study, which included a larger, more diverse, patient population and used rigorous propensity score weighting to account

Table 2. Weighted proportions of inadequate bowel preparation, adenoma, and SSP by GLP-1RA groups

Variable	All (N = 49,987)	Control (N = 45,718)	Treatment (N = 4,269)	P value
Inadequate bowel preparation, %	15.1	13.7	16.4	0.017
Adenoma, %	34.1	34.1	34.1	>0.99
SSP, %	5.9	6.4	5.5	0.21

N = unweighted number; % = weighted percentage. P values reflect comparisons across 4 groups; P value <0.05 is considered statistically significant. Overview of key outcome measures—proportions of inadequate bowel preparation, adenomas, and SSPs—for patients on GLP-1RA vs controls. The P values reflect comparisons between the 2 groups; a P value <0.05 is considered statistically significant. GLP-1RA, glucagon-like peptide-1 receptor agonists; SSP, sessile serrated polyp.

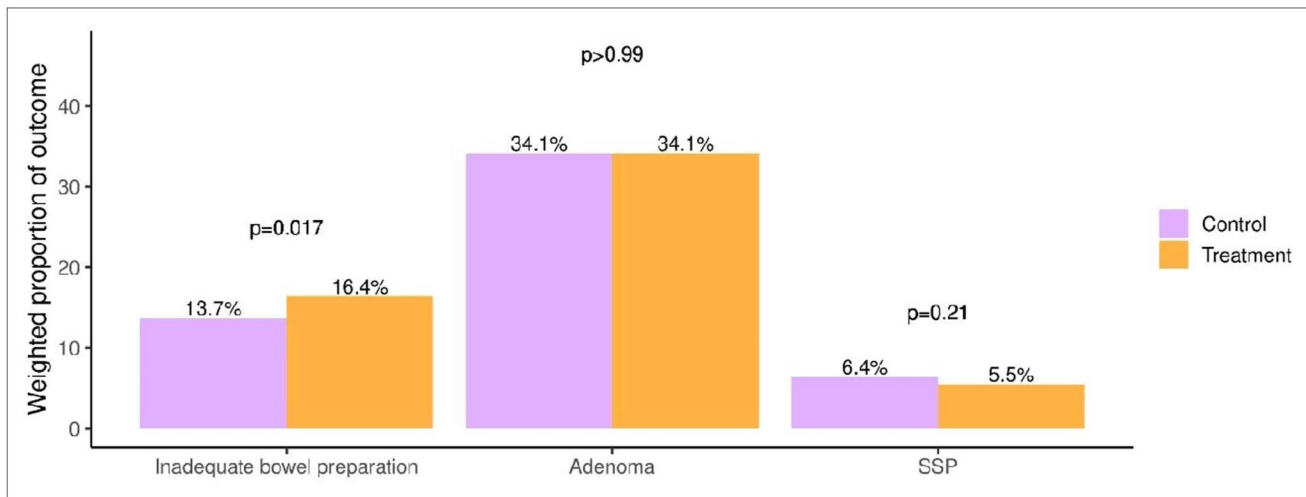


Figure 2. Weighted bar plots of inadequate bowel preparation, adenoma, and SSP by GLP-1RA groups. Proportions represent weighted estimates in each group. GLP-1RA users had significantly higher rates of inadequate bowel preparation (16.4% vs 13.7%, $P = 0.017$), whereas adenoma detection rates were identical between groups (34.1%, $P > 0.99$). SSP detection was numerically lower in the GLP-1RA group but not statistically significant (5.5% vs 6.4%, $P = 0.21$). All comparisons were conducted using weighted logistic regression. GLP-1RA, glucagon-like peptide-1 receptor agonists; SSP, sessile serrated polyp.

for confounders, found 23% higher odds of inadequate bowel preparation in patients using GLP-1RA.

To our knowledge, polyp detection rates have not previously reported in GLP-1RA users. In our study, we found that patients with diabetes on GLP-1RA had a 29% lower likelihood of SSP detection relative to controls. Given that SSPs are often flat and subtle in appearance, their detection is particularly affected by inadequate bowel preparation quality (23). These findings raise concern that impaired bowel cleansing associated with GLP-1RA use may reduce the effectiveness of colonoscopic screening for this important class of premalignant polyps.

By contrast, we found no significant difference in adenoma detection between GLP-1RA users and nonusers. This may be due

to higher adenoma rate among patients with diabetes and obesity, the primary populations prescribed GLP-1RA, which may have offset the impact of reduced bowel preparation quality (16,24). These findings are consistent with previous literature linking diabetes and obesity with increased adenoma risk (16). Unlike SSP, adenomas are generally easier to detect and less dependent on bowel preparation, which may explain why adenoma detection was similar in GLP-1RA users and nonusers (23).

The clinical implications of our findings are important especially given the exponential growth of GLP-1RA for managing diabetes and obesity and the need for high quality screening colonoscopy. Healthcare providers should be aware of the potential challenges in bowel preparation among patients using GLP-1RA who have diabetes. Recent studies with upper endoscopy procedures with GLP-users show retained gastric contents and increased aborted procedures; however, there was no increase in clinical outcomes of aspiration (25–30). Those with same-day colonoscopy as upper endoscopy had 75% less residual gastric contents (28). The question of whether to hold GLP-1 receptor agonists prior to colonoscopy is important. Currently, there is no clear consensus or guideline on this practice and clinical practice is varied. Our study suggests that holding GLP-1RA for colonoscopies may be a consideration and/or optimizing bowel preparation further, for example, increasing volume or duration of prep or clear liquids to ensure good quality screening colonoscopy especially in those with diabetes on GLP-1RA to minimize incomplete or aborted procedures and the need for repeat procedures and risk of anesthesia. Nonetheless, our results highlight the need for prospective randomized trials to evaluate the benefits and risks of holding GLP-1RA before colonoscopy, particularly in diabetic populations who are at higher risk of colorectal neoplasia (31).

Our study has several strengths including a large diverse real-world sample using different GLP analogs and different preps, rigorous adjustments for confounders through propensity score weighting, which mitigate confounding by indication and balance critical covariates. However, several limitations should be noted.

Table 3. Weighted multivariable logistic regression analyses

Characteristic	OR	95% CI	P value
Outcome: Inadequate bowel preparation			
Group			
Control	—	—	
Treatment	1.23	1.04–1.46	0.017
Outcome: Adenoma			
Group			
Control	—	—	
Treatment	1.00	0.88–1.13	>0.99
Outcome: SSP			
Group			
Control	—	—	
Treatment	0.85	0.65–1.10	0.21

CI, confidence interval; GLP-1RA, glucagon-like peptide-1 receptor agonists; OR, odds ratio.
p values are in bold when they are less than 0.05 (significant).

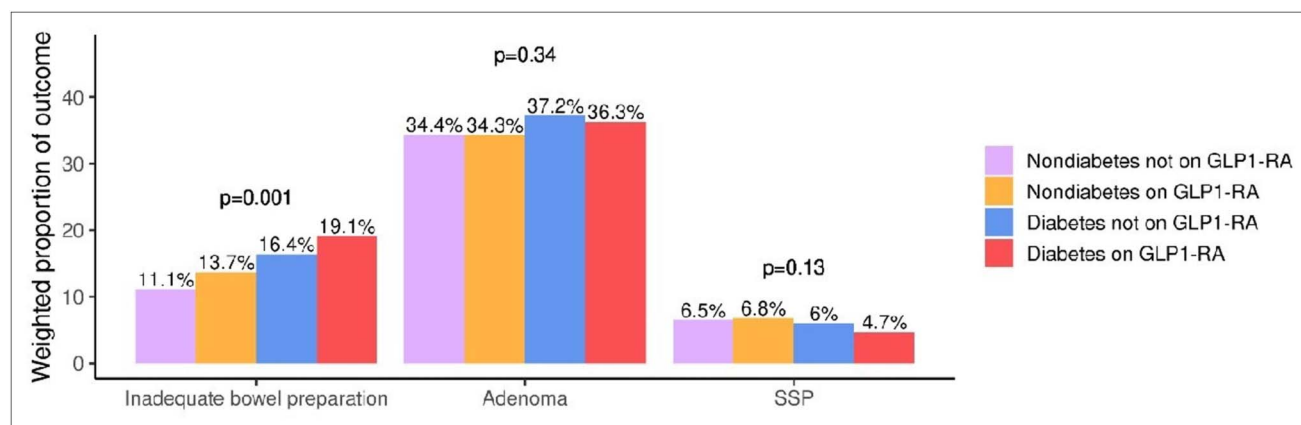


Figure 3. Weighted bar plots of inadequate bowel preparation, adenoma, and SSP by diabetes and GLP-1RA groups. Weighted bar plots of inadequate bowel preparation, adenoma detection, and SSP detection by diabetes and GLP-1RA status. Four mutually exclusive groups were analyzed: nondiabetes without GLP-1RA, nondiabetes with GLP-1RA, diabetes without GLP-1RA, and diabetes with GLP-1RA. Inadequate bowel preparation was significantly more common among patients with diabetes, especially those on GLP-1RA ($P = 0.001$). Adenoma detection rates varied slightly among groups ($P = 0.34$), whereas SSP detection showed a nonsignificant trend ($P = 0.13$). Comparisons were performed using weighted logistic regression across all 4 groups. GLP-1RA, glucagon-like peptide-1 receptor agonists; SSP, sessile serrated polyp.

First, as an observational study, we cannot infer definitive causality. Second, we lacked granular data on GLP-1RA dosing, duration, timing relative to the procedure and individual endoscopist detection rates, which may influence adenoma and SSP

detection. Third, although bowel prep quality was categorized as inadequate or adequate more detailed classifications might have refined our assessment of prep quality. Finally, polyp characteristics such as size, location and detailed histological information

Table 4. Weighted demographics and baseline characteristics by diabetes and GLP-1RA groups

Variable	All (N = 49,987)	Nondiabetes not on GLP-1RA (N = 39,800)	Nondiabetes on GLP-1RA (N = 1,443)	Diabetes not on GLP-1RA (N = 5,918)	Diabetes on GLP-1RA (N = 2,826)	P value	Absolute standardized difference (maximum pairwise)
Age, yr, median (25th, 75th)	58.0 (51.0, 65.0)	59.0 (51.0, 65.0)	57.0 (51.0, 65.0)	59.0 (51.0, 66.0)	58.0 (51.0, 65.5)	0.36	0.072
Sex, %						0.67	0.029
Male	46.4	46.6	45.0	47.5	46.5		
Female	53.6	53.4	55.0	52.5	53.5		
BMI, median (25th, 75th)	34.7 (30.7, 39.7)	34.5 (30.5, 39.5)	34.9 (31.4, 39.9)	34.5 (30.4, 39.3)	34.8 (30.6, 40.0)	0.14	0.065
Race, %						0.37	
White	64.2	63.4	66.3	63.5	63.8		0.051
Asian	1.0	1.0	0.4	1.3	1.2		0.075
Black	30.6	32.0	28.8	30.5	30.6		0.040
Others	4.3	3.7	4.6	4.7	4.4		0.032
Prokinetics, %	32.3	32.1	33.9	29.7	33.5	0.29	0.079
Anticholinergics, %	54.6	53.8	57.5	52.6	55.1	0.12	0.051
Antidiarrheal, %	6.3	5.6	6.2	6.8	6.8	0.58	0.048
Constipation, %	23.3	20.0	25.1	24.2	24.1	0.038	0.129
Opiates, %	31.4	31.7	31.4	32.1	30.6	0.82	0.031

Weighted demographic and clinical features of patients by diabetes and GLP-1RA groups. Variables include median (interquartile range) for continuous data, and percentage for categorical data. N = unweighted number. Maximum absolute standardized difference across all pairs after propensity score weighting was reported. GLP-1RA, glucagon-like peptide-1 receptor agonists.

Table 5. Weighted multivariable logistic regression analyses

Characteristic	OR	95% CI	P value
Outcome: Inadequate bowel preparation			
Group			
Nondiabetes not on GLP-1RA	—	—	
Nondiabetes on GLP-1RA	1.27	0.86–1.88	0.24
Diabetes not on GLP-1RA	1.56	1.27–1.92	<0.001
Diabetes on GLP-1RA	1.88	1.59–2.24	<0.001
Outcome: Adenoma			
Group			
Nondiabetes not on GLP-1RA	—	—	
Nondiabetes on GLP-1RA	0.99	0.81–1.21	0.94
Diabetes not on GLP-1RA	1.13	0.98–1.30	0.09
Diabetes on GLP-1RA	1.09	0.97–1.22	0.15
Outcome: SSP			
Group			
Nondiabetes not on GLP-1RA	—	—	
Nondiabetes on GLP-1RA	1.05	0.74–1.50	0.77
Diabetes not on GLP-1RA	0.92	0.69–1.23	0.58
Diabetes on GLP-1RA	0.71	0.57–0.89	0.003

CI, confidence interval; GLP-1RA, glucagon-like peptide-1 receptor agonists; OR, odds ratio; SSP, sessile serrated polyp.
p values are in bold when they are less than 0.05 (significant).

were not captured. These knowledge gaps highlight the need for future prospective studies that would integrate more detailed data, including new standardized bowel prep methods and detailed endoscopic findings especially in patients with diabetes with and without obesity on GLP analogs.

In summary, this the first study evaluating both colonoscopy preparation and polyp detection rates in GLP-1RA users. We found GLP-1RA use is associated with significantly higher rates of inadequate bowel preparation and reduced detection of SSPs, particularly in patients with diabetes. These findings underscore the importance of tailoring bowel preparation protocols for patients using GLP-1RA, especially in those with diabetes to ensure good quality screening colonoscopy and minimize need for repeat procedures.

CONFLICTS OF INTEREST

Guarantor of the article: Samita Garg, MD.

Specific author contributions: S.G. and D.J.C.: conceptualization (Lead). S.G. and D.J.C.: methodology (Lead). S.G.: supervision (Lead); S.G.: writing – original draft (Lead); S.G., D.H., D.L., S.V., A.L., J.J.V., and D.J.C.: writing – review & editing (Lead). D.H., D.L., and Q.Y.: formal analysis (Equal). D.H. and D.L.: methodology (Equal); Q.Y.: figure creation (Lead). Q.Y.: data tables and analysis (Lead).

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Potential competing interests: S.G. reports receiving an IIS grant from Abbott, a research grant with Enterra, and serving as a speaker/consultant for Novo Nordisk and Ardelyx. A.L. is a consultant to Takeda, Ironwood, Ardelyx, Vibrant, Evoke, and Atmo, and holds

stock in Johnson & Johnson, Allurion, and Bristol Myers Squibb. J.J.V.: reports serving on advisory boards for Atlas Endoscopy and Pentax Endoscopy; consulting for Olympus America, Inc., Boston Scientific, Inc., and Steris Medical, Inc.; receiving research funding from Olympus America, Inc.; and receiving patent royalties from Medtronic, Inc. The remaining authors have no relevant conflicts to declare.

Study Highlights

WHAT IS KNOWN

- ✓ Glucagon-like peptide-1 receptor agonists delay gastrointestinal motility. There is a lack of data of quality of colonoscopy preparation and polyp detection rate in patients on GLP-1RA.

WHAT IS NEW

- ✓ GLP-1RA use is associated with significantly higher rates of inadequate bowel preparation and reduced detection of SSPs, particularly in patients with diabetes.

REFERENCES

- Marx N, Husain M, Lehrke M, et al. GLP-1 receptor agonists for the reduction of atherosclerotic cardiovascular risk in patients with type 2 diabetes. *Circulation* 2022;146(24):1882–94.
- Ussher JR, Drucker DJ. Glucagon-like peptide 1 receptor agonists: Cardiovascular benefits and mechanisms of action. *Nat Rev Cardiol* 2023; 20(7):463–74.
- Marso SP, Daniels GH, Brown-Frandsen K, et al. Liraglutide and cardiovascular outcomes in type 2 diabetes. *N Engl J Med* 2016;375(4): 311–22.
- Marso SP, Bain SC, Consoli A, et al. Semaglutide and cardiovascular outcomes in patients with type 2 diabetes. *N Engl J Med* 2016;375(19): 1834–44.
- Kristensen SL, Rorth R, Jhund PS, et al. Cardiovascular, mortality, and kidney outcomes with GLP-1 receptor agonists in patients with type 2 diabetes: A systematic review and meta-analysis of cardiovascular outcome trials. *Lancet Diabetes Endocrinol* 2019;7(10): 776–85.
- Husain M, Birkenfeld AL, Donsmark M, et al. Oral semaglutide and cardiovascular outcomes in patients with type 2 diabetes. *N Engl J Med* 2019;381(9):841–51.
- McGuire DK, Shih WJ, Cosentino F, et al. Association of SGLT2 inhibitors with cardiovascular and kidney outcomes in patients with type 2 diabetes: A meta-analysis. *JAMA Cardiol* 2021;6(2): 148–58.
- Kanwal F, Kramer JR, Li L, et al. GLP-1 receptor agonists and risk for cirrhosis and related complications in patients with metabolic dysfunction-associated steatotic liver disease. *JAMA Intern Med* 2024; 184(11):1314–23.
- Loomba R, Hartman ML, Lawitz EJ, et al. Tirzepatide for metabolic dysfunction–associated steatohepatitis with liver fibrosis. *N Engl J Med* 2024;391(4):299–310.
- Drucker DJ. Mechanisms of action and therapeutic application of glucagon-like peptide-1. *Cell Metab* 2018;27(4):740–56.
- Zhang J, Chen G, Li Z, et al. Colonoscopic screening is associated with reduced colorectal cancer incidence and mortality: a systematic review and meta-analysis. *J Cancer* 2020;11(20):5953–70.
- Liang S, Oscarson B, Kenkare P, et al. Trends in detection of adenoma and sessile serrated lesions over a decade in a community-based healthcare system. *Clin Transl Gastroenterol* 2024;15(3):e00683.
- Gangwani MK, Aziz A, Dahiya DS, et al. History of colonoscopy and technological advances: A narrative review. *Transl Gastroenterol Hepatol* 2023;8:18.
- Harris E. Poll: Roughly 12% of US adults have used a GLP-1 drug, even if unaffordable. *JAMA* 2024;332(1):8.

15. Mahmood S, Farooqui SM, Madhoun MF. Predictors of inadequate bowel preparation for colonoscopy: A systematic review and meta-analysis. *Eur J Gastroenterol Hepatol* 2018;30(8):819–26.
16. Ottaviano LF, Li X, Murray M, et al. Type 2 diabetes impacts colorectal adenoma detection in screening colonoscopy. *Sci Rep* 2020;10(1):7793.
17. Shah YR, Takriti M, Dahiya DS, et al. S702 The impact of glycemic control on the quality of bowel preparation in patients undergoing elective colonoscopy: A retrospective multi-center study. *Am J Gastroenterol* 2023;118(10S):S515.
18. Agha OQ, Alsayid M, Brown MD. Bowel preparation in diabetic patients undergoing colonoscopy. *Ann Gastroenterol* 2021;34(3):310–5.
19. Sharma T, Das N, Ismail B, et al. Evaluation of the effect of GLP-1 agonists on quality of bowel preparation for colonoscopy in patients with diabetes. *Pract Diabetes* 2017;34(5):167–8.
20. Tong Y, Huang JQ, Chen Y, et al. Impact of glucagon-like peptide 1 receptor agonist liraglutide and dipeptidyl peptidase-4 inhibitor sitagliptin on bowel cleaning and gastrointestinal symptoms in type 2 diabetes. *Front Pharmacol* 2023;14:1176206.
21. Yao R, Gala KS, Ghosn W, et al. Effect of Glucagon-Like Peptide-1 Receptor Agonists on Bowel Preparation for Colonoscopy. *Am J Gastroenterol* 2024;119(6):1154–7.
22. Abu-Freha N, Yitzhak A, Shirin H, et al. Glucagon-like peptide-1 receptor agonists significantly affect the quality of bowel preparation for colonoscopy. *Endoscopy* 2025;57(2):126–33.
23. Ma MX, Bourke MJ. Sessile Serrated Adenomas: How to Detect, Characterize and Resect. *Gut Liver* 2017;11(6):747–60.
24. Kumar R, Brown A, Okano S, et al. Overweight and obesity are associated with colorectal neoplasia in an Australian outpatient population. *Sci Rep* 2024;14(1):23501.
25. Singh S, Rahman SH, Khan N, et al. Effects of glucagon-like peptide-1 receptor agonists on endoscopy outcomes: systematic review and meta-analysis. *Gastrointest Endosc* 2025;101(2):343–9.e5.
26. Garza K, Aminpour E, Shah J, et al. Glucagon-like peptide-1 receptor agonists increase solid gastric residue rates on upper endoscopy especially in patients with complicated diabetes: A case-control study. *Am J Gastroenterol* 2024;119(6):1081–8.
27. Facciorusso A, Ramai D, Dhar J, et al. Effects of glucagon-like peptide-1 receptor agonists on upper gastrointestinal endoscopy: A meta-analysis. *Clin Gastroenterol Hepatol* 2025;23(5):715–25.e3.
28. Firkins SA, Yates J, Shukla N, et al. Clinical outcomes and safety of upper endoscopy while on glucagon-like peptide-1 receptor agonists. *Clin Gastroenterol Hepatol* 2025;23(5):872–3.e3.
29. Barlowe TS, Anderson C, Sandler RS, et al. Glucagon-like peptide-1 receptor agonists do not increase aspiration during upper endoscopy in patients with diabetes. *Clin Gastroenterol Hepatol* 2025;23(5):739–47.
30. Anazco D, Fansa S, Hurtado MD, et al. Low incidence of pulmonary aspiration during upper endoscopy in patients prescribed a glucagon-like peptide-1 receptor agonist. *Clin Gastroenterol Hepatol* 2024;22(6):1333–5.e2.
31. Nasser J, Hosseini A, Barlow G, et al. Food retention at endoscopy among adults using glucagon-like peptide-1 receptor agonists. *JAMA Netw Open* 2024;7(10):e2436783.

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