

Comparative Study of Single Versus Split Dose Polyethylene Glycol Electrolyte Solution Before Undergoing Colonoscopy

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ABSTRACT

Objective: To compare the outcome of consumption of a single versus split-dose polyethylene glycol electrolyte solution in patients undergoing colonoscopy in the morning.

Methodology: A randomised controlled trial was conducted at the Department of Gastroenterology, Sir Ganga Ram Hospital, Lahore, from April to July 2021. A total of 274 patients undergoing colonoscopy, who fulfilled the selection criteria were included through a "non-probability, consecutive sampling technique". The patients were randomly divided into two groups. In group A, single dose of PEG was administered. Group B was administered a split dose of PEG which was to be consumed in two parts, 1st in evening before colonoscopy and the second in the morning. Efficacy was labelled if adequate cleaning of the intestines and a BBPS score of ≥ 6 were achieved during colonoscopy.

Results: In the single dose group, the mean age of patients was 45.15 ± 13.37 years, 68 (49.6%) patients were male, 69 (50.4%) patients were female, efficacy of the procedure was achieved in 54 (39.4%) patients, and the mean BBPS score was 4.99 ± 0.90 . In the split dose group, mean age of patients was 49.85 ± 11.38 years, 56 (40.9%) patients were male, 81 (59.1%) patients were female, efficacy of the procedure was achieved in 137 (100%) patients, and the mean BBPS score was 7.61 ± 0.49 . The difference in both groups was highly significant (p-value < 0.0001).

Conclusion: A split dose is thus more efficacious and acceptable than a single dose of polyethylene glycol electrolyte solution given for bowel preparation.

Keywords: single dose, polyethylene glycol electrolyte solution, colonoscopy, split dose.

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Introduction

Understanding and mastery of cognitive and technical abilities are required to perform a high-quality colonoscopic examination.¹ Colonoscopy is the gold standard for visualizing the colon's mucosa and identifying problematic lesions that require excision or biopsy. Bowels can be prepared before undergoing colonoscopy by employing a variety of procedures. The failure to accomplish good cecal intubation and mucosal visibility characterizes incomplete colonoscopies.²

Due to its driving mechanism, colonoscopy is a technically demanding operation that necessitates significant training to reduce discomfort and avoid damage.³ Endoscopists most commonly utilize air insufflation colonoscopy, which dilates the colon and allows vision of the colonic mucosa. However, patients are irritated by this procedure, which necessitates the use of an anaesthetist to give sedation. Furthermore, patients frequently complain of post-operative pain.⁴

Insufficient intestinal preparation results in complications or hindrances in 10% to 20% of colonoscopies. Patient pain and fluid and electrolyte changes are reduced with proper preparation.^{5, 6} In a single-center study, the risks of missing pathologic findings in a screening colonoscopy were considerably higher than in a surveillance colonoscopy for adenomas.⁷

The most common deterrent to having a screening colonoscopy for colorectal cancer, according to the findings of a single-center prospective study, was bowel preparation.⁸ The success of a colonoscopy depends on proper bowel preparation. Inadequate bowel preparation has been linked to a variety of issues.^{9, 10} Dosing protocol (e.g., split-dosing, time between preparation completion and colonoscopy), the volume of bowel preparation required to be consumed by the patients, and preparation palatability have all been proven to have an influence on preparation quality.¹⁰⁻¹²

The rationale of this study is to compare the efficacy of single- versus split-dose polyethylene glycol electrolyte solution for morning colonoscopy. Literature has shown that there is a significant impact of a split dose of PEG compared to a single dose and patients feel more comfortable consuming the former. Not much data is available in this regard, and no study has been done before in Pakistan. Therefore, this study is being done in local settings. This will help us in the implementation of a better protocol in our local setting for colonoscopy,

Methodology

From April to July 2021, a randomised controlled trial was conducted at the department of gastroenterology at Sir Ganga Ram Hospital in Lahore. After taking approval from the hospital ethical committee. The study enrolled 274 cases from the OPD of the Department of Gastroenterology, Sir Ganga Ram Hospital, Lahore, who met inclusion criteria. Informed consent and demographics like name, age, gender, BMI, duration of symptoms, diabetes (BSR>200mg/dl) and indication of colonoscopy were noted. All patients were instructed to take a low-residue diet the day before the colonoscopy. The WHO calculator estimated the sample size to be 274 cases; 137 cases in each group with a power of study of 80%, confidence level of 95%, and mean BBPS score of 7.25 1.53 with split dose and 6.71 1.65 with single dose of polyethylene glycol electrolyte solution for morning colonoscopy. Patients who fulfilled selection criteria

were included through a "non-probability, consecutive sampling technique."

Patients between the ages of 20 to 70 who are receiving a colonoscopy are eligible. Patients with severe and chronic constipation, suspicion of bowel obstruction or perforation, h/o colon surgery, inflammatory bowel disease, chronic renal failure, congestive heart failure, pregnancy, or lactation were excluded from the study. The patients were randomly divided in two groups by using the lottery method. In groups A, single (one) dose of PEG was advised which was to be dissolved in 2 liters of plain water and then to be consumed around 4 – 6 am in the morning before undergoing colonoscopy. In group B, Split dose (two doses of same quantity) of PEG was advised, which was to be dissolved in 2 liters of plain water and one (1 liter) was to be consumed in the evening before the day of endoscopy at around 8 – 9 pm, and the remaining 1 Liter to be taken in the morning, at around 5 – 6 am. All the patients then underwent colonoscopy. Patients were asked about the comfort of colonoscopy and acceptability of the bowel preparation regimen. Total time taken for insertion of colonoscope and adequate cleaning rate were noted. Efficacy was labelled if adequate cleaning of intestines and BBPS score of ≥ 6 were achieved during colonoscopy (Table I). Patients were managed as per standard protocol. All this procedure was noted on a proforma.

Table I: Boston Bowel Preparation Scale (BBPS)

BBPS		3	2	1	0
3=Excellent					
2=Good					
1=Poor					
0=Inadequate					
LC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BBPS=	<input type="checkbox"/>				

Score	Description
0	Unprepared colon segment with mucosa not seen because of solid stool that cannot be cleared
1	Portion of mucosa of the colon segment seen, but other areas of the colon segment are not well seen because of staining, residual stool, and/or opaque liquid
2	Minor amount of residual staining, small fragments of stool, and/or opaque liquid, but mucosa of colon segment is seen well
3	Entire mucosa of colon segment seen well with no residual staining, small fragments of stool, or opaque liquid

SPSS 22.0 was used to enter and analyse the data. The mean and standard deviation were used to present

numerical factors such as age, BMI, and the duration of symptoms. Gender, diabetes, colonoscopy indication, and efficacy were reported as frequency and percentages for categorical variables. The chi-square test was used to compare the efficacy of both groups. P-value ≤ 0.05 was considered as significant.

Results

Out of 274 cases, 137 were randomized to take a single dose of polyethylene glycol electrolyte solution before undergoing colonoscopy, while 137 were randomized to taken split (two) doses of polyethylene glycol electrolyte solution. The mean age of patients in single dose group was 45.15 ± 13.37 years and the mean age of patients in split dose group was 49.85 ± 11.38 years. In single dose group, there were 68 (49.6%) male patients and 69 (50.4%) female patients. In split dose group, there were 56 (40.9%) male patients and 81 (59.1%) female patients. In single dose group, the mean BMI of patients was 24.94 ± 2.17 kg/m² and in split dose group, the mean BMI of patients was 24.49 ± 2.99 kg/m². In single dose group, the leading cause (indication) for colonoscopy was gastrointestinal bleeding, and it was observed in 68 (49.6%) patients, followed by persistent diarrhea i.e. in 41 (29.9%) patients and other gastrointestinal complications 28 (20.4%) patients. In split dose group, the leading cause (indication) for colonoscopy was persistent diarrhea, and it was observed in 54 (39.4%) patients, followed by gastrointestinal complications in 41 (29.9%) patients, i.e. gastrointestinal bleeding [28 (20.4%) patients] and colon cancer [14 (10.2%) patients]. The mean duration of diarrhea was 6.18 ± 4.93 months in single dose group and 19.91 ± 16.54 months in split dose group. In the single dose group, there was no patient who had diabetes (0.0%). But in split dose group, 27 (19.7%) patients had a history of diabetes while 110 (80.3%) patients were non-diabetic. (Table II) Overall, The efficacy of the procedure was achieved in 191 (69.71%) patients and unachieved in 83 (30.29%) patients.

In the single dose group, efficacy of the procedure was achieved in 54 (39.4%) patients, while in 83 (60.6%) patients, efficacy could not be achieved. In the split dose group, efficacy of the procedure was achieved in 137 (100%) patients while no (0.0%) patients had procedure failure. The difference in both groups was highly significant (p-value < 0.0001). In single dose group, the mean BBPS score was 4.99 ± 0.90 , which was significantly lower than the mean BBPS score achieved

by split dose group i.e. 7.61 ± 0.49 (p-value < 0.0001). In the single dose group, acceptability of the procedure was achieved in 54 (39.4%) patients, while in 83 (60.6%) patients, acceptability could not be achieved. In split dose group, acceptability of the procedure was achieved in 137 (100%) patients, while no (0.0%) patient was dissatisfied with the procedure. The difference in both groups was highly significant (p-value < 0.0001). Table III

Table II: Baseline characteristics of patients

Characteristics	Study group	
	Single dose (n=137)	Split dose (n=137)
Age (years)	45.15 \pm 13.37	49.85 \pm 11.38
Gender		
Male	68 (49.6%)	56 (40.9%)
Female	69 (50.4%)	81 (59.1%)
BMI	24.94 \pm 2.17	24.49 \pm 2.99
Indication of colonoscopy		
Gastrointestinal Bleeding	68 (49.6%)	28 (20.4%)
Colon cancer	0 (0.0%)	14 (10.2%)
Gastrointestinal Complication	28 (20.4%)	41 (29.9%)
Persistent diarrhea	41 (29.9%)	54 (39.4%)
Duration of symptoms	6.18 \pm 4.93	19.91 \pm 16.54
Diabetes		
Yes	0 (0.0%)	27 (19.7%)
No	137 (100%)	110 (80.3%)

Table III: Comparison of outcome of in both groups

Characteristics	Study group		P-value
	Single dose	Split dose	
Efficacy achieved			
Yes	54 (39.4%)	137 (100%)	0.000
No	83 (60.6%)	0 (0.0%)	
BBPS score	4.99 \pm 0.90	7.61 \pm 0.49	0.000
Acceptability			
Yes	54 (39.4%)	137 (100%)	0.000
No	83 (60.6%)	0 (0.0%)	

Discussion

In Asian countries, the low volume 2 L PEG is favoured due to the smaller body size and lower body weight.¹³ Several studies have recently revealed that 2 L versus 4 L PEG has non-inferior effectiveness in bowel cleaning.¹⁴ For an afternoon colonoscopy, 2L PEG was utilized with high-quality bowel preparation.¹⁵ However, 2L PEG taken the day before colonoscopy did not provide appropriate bowel preparation for morning colonoscopy. The considerable time delay between PEG consumption and the colonoscopy procedure, which has been demonstrated to be best regulated at 4–6 hours, might be the main reason.^{16,17}

To meet the ideal interval time, patients must get up early in the morning to prepare for the morning colonoscopy, as they must complete the laxative at least 2 hours before the procedure. This may result in a lack of compliance and discontent. For different medication formulations, a split dose regimen has been shown to be more efficacious than a single dose regimen. However, minimal evidence has focused on morning colonoscopy.¹⁸⁻²⁰

In our study, in the single dose group, efficacy of the procedure was achieved in 54 (39.4%) patients, while in 83 (60.6%) patients, efficacy could not be achieved. In the split dose group, efficacy of the procedure was achieved in 137 (100%) patients, while no (0.0%) patients had procedure failure. The difference in both groups was highly significant (p -value < 0.0001). In the single dose group, the mean BBPS score was 4.99 ± 0.90 , which was significantly lower than the mean BBPS score achieved by the split dose group, i.e. 7.61 ± 0.49 (p -value < 0.0001).

Shan et al., found that the split dose group showed better bowel cleansing in terms of higher adequate cleaning rate (89.9% vs. 80.3%, $P = 0.023$) and BBPS scores (7.25 ± 1.53 vs. 6.71 ± 1.65 , $P < 0.005$) compared to the single dose group.²¹

The traditional method of colon preparation entails drinking a significant amount of a cleaning solution the night before the operation. Splitting the dosage such that the patient takes half the solution the night before colonoscopy and the other half the next morning, generally approximately 4 to 5 hours before the procedure, is one method to improve tolerability and patient adherence.^{22, 23}

Previous research has shown that split dosage not only increases patient tolerability, but also cleans the colon more effectively.²⁴ Twelve of the previous 13 prospective, randomized trials found that giving the entire or part of the bowel preparation the morning of the scheduled colonoscopy resulted in better cleaning.²⁵⁻²⁷

However, because colonoscopies are frequently planned in the afternoon, divided dosage may not result in a clear colon by that time. A recent research by Matro et al., found that morning dosage and split preparation had comparable cleaning efficacy and tolerance when operations are scheduled for the afternoon; this study did not cover procedures scheduled in the morning.²⁸

The split dosage group had considerably superior preparation quality (p -value = 0.011). In terms of adverse

effects (save for bloating, which was more common in the split dose group, p -value = 0.039) or desire to repeat the preparation, there were no differences in general tolerability across study groups. In the split dose group, there was a nonsignificant tendency toward better adherence to the allocated preparation (p -value = 0.062). The study of inter- and intra-observer variability revealed a good to outstanding correlation between endoscopists.²⁹

But Park et al., found that there is no difference in the compliance whether the dose was given in a single shot or in two split doses. However, divided doses were shown to be superior to single doses in terms of bowel preparation quality. When the participants were divided into groups based on their compliance (good compliance, 116 in single dose and 119 in split dose; poor compliance, 36 in single dose and 21 in split dose), the quality of the bowel preparation was higher in the good compliance group than in the poor compliance group, and the difference was usually significant in the split dose group. For patients having an early-morning colonoscopy, the bowel preparation with split dose polyethylene glycol solution gave a superior quality preparation than the conventional approach.¹⁹

Conclusion

Thus split dose is more efficacious and acceptable than single dose of polyethylene glycol electrolyte solution for bowel preparation prior to colonoscopy.

References

1. Rex DK, Schoenfeld PS, Cohen J, Pike IM, Adler DG, Fennerty MB, et al. Quality indicators for colonoscopy. *Gastrointestinal endoscopy* 2015 ;81(1):31-53. <https://doi.org/10.1016/j.gie.2014.07.058>
2. Patel N, Kashyap S, Mori. A. Bowel preparation. Treasure Island (FL): StatPearls Publishing; 2020.
3. Mamunes AP, Campisano F, Martin J, Scaglioni B, Mazomenos E, Valdastrì P, et al. Magnetic flexible endoscope for colonoscopy: an initial learning curve analysis. *Endoscopy international open* 2021;9(2):E171-e80. <https://doi.org/10.1055/a-1314-9860>
4. Hayman CV, Vyas D. Screening colonoscopy: The present and the future. *World journal of gastroenterology* 2021 Jan 21;27(3):233-9. <https://doi.org/10.3748/wjg.v27.i3.233>
5. Saltzman JR, Cash BD, Pasha SF, Early DS, Muthusamy VR, Khashab MA, et al. Bowel preparation before colonoscopy. *Gastrointestinal endoscopy* 2015 ;81(4):781-94. <https://doi.org/10.1016/j.gie.2014.09.048>
6. Elarini T, Wexner SD, Isenberg GA. The need for standardization of colonoscopic tattooing of colonic lesions. *Diseases of the colon and rectum* 2015;

- 58(2):264-7.
<https://doi.org/10.1097/DCR.0000000000000304>
7. Greenspan M, Chehl N, Shawron K, Barnes L, Li H, Avery E, et al. Patient non-adherence and cancellations are higher for screening colonoscopy compared with surveillance colonoscopy. *Digestive diseases and sciences* 2015;60(10):2930-6.
<https://doi.org/10.1007/s10620-015-3664-2>
 8. Harewood GC, Wiersema MJ, Melton III LJ. A prospective, controlled assessment of factors influencing acceptance of screening colonoscopy. *The American journal of gastroenterology* 2002;97(12):3186-94.
<https://doi.org/10.1111/j.1572-0241.2002.07129.x>
 9. Cash BD, Moncrief MBC, Epstein MS, Poppers DM. Patient experience with NER1006 as a bowel preparation for colonoscopy: a prospective, multicenter US survey. *BMC gastroenterology* 2021;21(1):70-.
<https://doi.org/10.1186/s12876-021-01605-y>
 10. Martel M, Barkun AN, Menard C, Restellini S, Kherad O, Vanasse A. Split-dose preparations are superior to day-before bowel cleansing regimens: a meta-analysis. *Gastroenterology* 2015;149(1):79-88.
<https://doi.org/10.1053/j.gastro.2015.04.004>
 11. Siddiqui AA, Yang K, Spechler SJ, Cryer B, Davila R, Ciper D, et al. Duration of the interval between the completion of bowel preparation and the start of colonoscopy predicts bowel-preparation quality. *Gastrointestinal endoscopy* 2009;69(3):700-6.
<https://doi.org/10.1016/j.gie.2008.09.047>
 12. Harrison NM, Hjelkrem MC. Bowel cleansing before colonoscopy: Balancing efficacy, safety, cost and patient tolerance. *World journal of gastrointestinal endoscopy* 2016;8(1):4. <https://doi.org/10.4253/wjge.v8.i1.4>
 13. Endoscopy CSfG. Chinese consensus on bowel preparation before endoscopy. *Chin J Pract Int Med* 2019;33:705-7.
 14. Ell C, Fischbach W, Bronisch HJ, Dertinger S, Layer P, Rünzi M, et al. Randomized trial of low-volume PEG solution versus standard PEG + electrolytes for bowel cleansing before colonoscopy. *Am J Gastroenterol* 2008 ;103(4):883-93.
<https://doi.org/10.1111/j.1572-0241.2007.01708.x>
 15. Avalos DJ, Castro FJ, Zuckerman MJ, Keihanian T, Berry AC, Nutter B, et al. Bowel Preparations Administered the Morning of Colonoscopy Provide Similar Efficacy to a Split Dose Regimen: A Meta-Analysis. *Journal of clinical gastroenterology* 2018 ;52(10):859-68.
<https://doi.org/10.1097/MCG.0000000000000866>
 16. Tan JJ, Tjandra JJ. Which is the optimal bowel preparation for colonoscopy - a meta-analysis. *Colorectal disease : the official journal of the Association of Coloproctology of Great Britain and Ireland* 2006 May;8(4):247-58.
<https://doi.org/10.1111/j.1463-1318.2006.00970.x>
 17. Parra-Blanco A, Nicolas-Perez D, Gimeno-Garcia A, Grosso B, Jimenez A, Ortega J, et al. The timing of bowel preparation before colonoscopy determines the quality of cleansing, and is a significant factor contributing to the detection of flat lesions: a randomized study. *World journal of gastroenterology* 2006 Oct 14;12(38):6161-6.
<https://doi.org/10.3748/wjg.v12.i38.6161>
 18. El Sayed AM, Kanafani ZA, Mourad FH, Soweid AM, Barada KA, Adorian CS, et al. A randomized single-blind trial of whole versus split-dose polyethylene glycol-electrolyte solution for colonoscopy preparation. *Gastrointestinal endoscopy* 2003 Jul;58(1):36-40.
<https://doi.org/10.1067/mge.2003.318>
 19. Park JS, Sohn CI, Hwang SJ, Choi HS, Park JH, Kim HJ, et al. Quality and effect of single dose versus split dose of polyethylene glycol bowel preparation for early-morning colonoscopy. *Endoscopy* 2007 ;39(7):616-9.
<https://doi.org/10.1055/s-2007-966434>
 20. Shah H, Desai D, Samant H, Davavala S, Joshi A, Gupta T, et al. Comparison of split-dosing vs non-split (morning) dosing regimen for assessment of quality of bowel preparation for colonoscopy. *World J Gastrointest Endosc* 2014;6(12):606-11. <https://doi.org/10.4253/wjge.v6.i12.606>
 21. Shan J, Yang M, Ran W, Xi W, Jiang L, Sun X. Efficacy of single- versus split-dose polyethylene glycol electrolyte solution for morning colonoscopy: A randomized controlled study. *Saudi Journal of Gastroenterology* 2020;26(6):321-5. https://doi.org/10.4103/sjg.SJG_58_20
 22. Tan JJY, Tjandra J. Which is the optimal bowel preparation for colonoscopy—a meta-analysis. *Colorectal Disease* 2006;8(4):247-58. <https://doi.org/10.1111/j.1463-1318.2006.00970.x>
 23. Belsey J, Epstein O, Heresbach D. Systematic review: oral bowel preparation for colonoscopy. *Alimentary pharmacology & therapeutics* 2007;25(4):373-84.
<https://doi.org/10.1111/j.1365-2036.2006.03212.x>
 24. Rex DK, Imperiale TF, Latinovich DR, Bratcher LL. Impact of bowel preparation on efficiency and cost of colonoscopy. *The American journal of gastroenterology* 2002;97(7):1696-700.
<https://doi.org/10.1111/j.1572-0241.2002.05827.x>
 25. Parra-Blanco A, Nicolás-Pérez D, Gimeno-García A, Grosso B, Jiménez A, Ortega J, et al. The timing of bowel preparation before colonoscopy determines the quality of cleansing, and is a significant factor contributing to the detection of flat lesions: a randomized study. *World journal of gastroenterology: WJG* 2006;12(38):6161.
<https://doi.org/10.3748/wjg.v12.i38.6161>
 26. Wruble L, DeMicco M, Medoff J, Safdi A, Bernstein J, Dalke D, et al. Residue-free sodium phosphate tablets (OsmoPrep) versus Visicol for colon cleansing: a randomized, investigator-blinded trial. *Gastrointestinal endoscopy* 2007;65(4):660-70.
<https://doi.org/10.1016/j.gie.2006.07.047>
 27. Di Palma JA, Rodriguez R, McGowan J. A randomized clinical study evaluating the safety and efficacy of a new, reduced-volume, oral sulfate colon-cleansing preparation for colonoscopy. *Official journal of the American College of Gastroenterology| ACG* 2009;104(9):2275-84.
<https://doi.org/10.1038/ajg.2009.389>

28. Matro R, Shnitser A, Spodik M, Daskalakis C, Katz L, Murtha A, et al. Efficacy of morning-only compared with split-dose polyethylene glycol electrolyte solution for afternoon colonoscopy: a randomized controlled single-blind study. *Official journal of the American College of Gastroenterology* | ACG 2010;105(9):1954-61. <https://doi.org/10.1038/ajg.2010.160>
29. Aoun E, Abdul-Baki H, Azar C, Mourad F, Barada K, Berro Z, et al. A randomized single-blind trial of split-dose PEG-electrolyte solution without dietary restriction compared with whole dose PEG-electrolyte solution with dietary restriction for colonoscopy preparation. *Gastrointestinal endoscopy* 2005 2005/08/01;62(2):213-8. [https://doi.org/10.1016/S0016-5107\(05\)00371-8](https://doi.org/10.1016/S0016-5107(05)00371-8)